DOCUMENT RESUME

ED 104 056 EC 071 656

AUTHOR	Taylor, Arthur M.; And Others
TITLE	Elaboration as an Instructional Technique in the Vocabulary Development of EMR Children. Research Report No. 59.
INSTITUTION	Minnesota Univ., Minneapolis. Research, Development, and Demonstration Center in Education of Handicapped Children.
SPONS AGENCY	Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.
PUB DATE	Mar 74
GRANT	OEG-0-9-332189-4533(032)
NOTE	93p.
EDRS PRICE	MF-$0.76 HC-$4.43 PLUS POSTAGE
DESCRIPTORS	*Associative Learning; *Educable Mentally Handicapped; Exceptional Child Research; Mentally Handicapped; Primary Grades; *Teaching Methods; *Vocabulary Development
IDENTIFIERS	Elaboration

ABSTRACT

Due to recent interest in the use of elaborative contexts to enhance associative learning, the effectiveness of elaboration as an instructional technique in vocabulary development was evaluated with 107 educable mentally retarded children in three primary level classes. Ss were given vocabulary instruction under one of three instructional conditions: Relational (relational elaborations and thematic summary), Non-Relational (non-relational elaborations and non-relational summary), and Mixed (non-relational elaborations and thematic summary). Analyses of data related to vocabulary development and the utilization of instructional strategies indicated that all conditions demonstrated increases in "specific" vocabulary development and that the utilization of instructional strategies varied with the conditions. Evaluation of the three instructional conditions revealed that those receiving thematic summaries (the Relational and Mixed conditions) resulted in generally better performances. Results led to several suggestions for the development of elaboration-based vocabulary instruction for retarded children such as that concrete vocabulary words are easier to develop than are more abstract words. (Appendixes include a sample vocabulary lesson and the four tests used in the study. (LS)

ED104056

EC

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

RESEARCH REPORT #59

Project No. 332189
Grant No. OE-09-332189-4533 (032)

ELABORATION AS AN INSTRUCTIONAL TECHNIQUE IN THE VOCABULARY DEVELOPMENT OF EMR CHILDREN

Arthur M. Taylor, Martha L. Thurlow, James E. Turnure[1]
University of Minnesota
Research, Development and Demonstration
Center in Education of Handicapped Children
Minneapolis, Minnesota

March 1974

Department of Health, Education and Welfare

U. S. Office of Education

Bureau of Education for the Handicapped

EC071656

TECHNICAL REPORTS

University of Minnesota Research, Development and Demonstration
Center in Education of Handicapped Children

(Place of publication shown in parentheses where applicable)

1. A. Taylor, M. Thurlow & J. Turnure. Elaboration as an instructional technique in the vocabulary development of EMR children. March 1974.

2. N. Buium & J. Turnure. The universality of self-generated verbal mediators as a means of enhancing memory processes. Research Report #58. January 1974.

3. D. Moores, K. Weiss, & M. Goodwin. Evaluation of programs for hearing impaired children: Report of 1972-73. Research Report #57. December 1973.

4. J. Turnure, J. Charlesworth, D. Moores, J. Rynders, M. Horrobin, S. Samuels & R. Wozniak. American Psychological Association Symposium Papers. Occasional Paper #24. December 1973.

5. N. Buium. Interrogative types in parental speech to language learning children; a linguistic universal? Research Report #56. December 1973.

6. D. Kraus. An outline of the basic concepts of order analysis. Occasional Paper #23. February, 1974.

7. D. Kraus. Order analysis: A fortran program for generalizable multidimensional analysis of binary data matrices. Occasional Paper #22. November 1973.

8. W. Bart. The pseudo-problem of IQ. Occasional Paper #21. October 1973.

9. J. Turnure & M. Thurlow. Verbal elaboration and the enhancement of language abilities in the mentally retarded: The role of interrogative sentence-forms*. Occasional Paper #20. October 1973.

10. P. Dahl, S. Samuels & T. Archwamety. A master based experimental program for teaching poor readers high speech word recognition skills. Research Report #55. September 1973.

11. R. Riegel, F. Danner & L. Donnelly. Development trends in the generation and utilization of associative relations for recall by EMR and non-retarded children: The SORTS test. Research Report #54.

12. R. Hoffmeister & D. Moores. The acquisition of specific reference in the linguistic system of a deaf child of deaf parents. Research Report #53. August 1973.

13. W. Bart & M. Smith. An interpretive framework of cognitive structures. Occasional Paper #19. June 1973.

14. C. Clark & J. Greco. MELDS (Minnesota Early Language Development Sequence) Glossary of Rebuses and Signs. Occasional Paper #18. June 1973.

15. J. Turnure. Interrelations of orienting response, response latency and stimulus choice in children's learning. Research Report #52. May 1972.

16. S. Samuels & P. Dahl. Automaticity, reading and mental retardation. Occasional Paper #17. May 1973.

17. S. Samuels & P. Dahl. Relationships among IQ, learning ability, and reading achievement. Occasional Paper #16. May 1973.

18. N. Buium & J. Rynders. The early maternal linguistic environment of normal and Down's Syndrome (Mongoloid) language learning children. Research Report #51. May 1973.

19. T. Archwamety & S. Samuels. A mastery based experimental program for teaching mentally retarded children word recognition and reading comprehension skills through use of hypothesis/test procedures. Research Report #50. May 1973.

20. W. Bart. The process of cognitive structure complexification. Research Report #49. April 1973.

21. B. Best. Classificatory development in deaf children: Research on language and cognitive development. Occasional Paper #15. April 1973.

22. R. Riegel, A. Taylor, & F. Danner. The effects of training in the use of a grouping strategy on the learning and memory capabilities of young EMR children. Research Report #48. April 1973.

23. J. Turnure & M. Thurlow. The latency of forward and backward association responses in an elaboration task. Research Report #47. March 1973.

24. R. Riegel & A. Taylor. Strategies in the classroom: A summer remedial program for young handicapped children. Occasional Paper #14. March 1973.

25. D. Moores. Early childhood special education for the hearing impaired. Occasional Paper #13. February 1973.

26. R. Riegel & A. Taylor. A comparison of concerual strategies for grouping and remembering employed by educable mentally retarded and non-retarded children. Research Report #46. February 1973.

27. J. Rynders. Two basic considerations in utilizing mothers as tutors of their very young retarded or potentially retarded children. Occasional Paper #12. January 1973.

28. R. Bruininks, J. Rynders & J. Gross. Social acceptance of mildly retarded pupils in resource rooms and regular classes. Research Report #45. January 1973.

29. J. Turnure & M. Thurlow. The effects of interrogative elaborations on the learning of normal and EMR children. Research Report #44. January 1973. (Proceedings of the International Association for the Scientific Study of Mental Deficiency, in press).

30. J. Turnure & S. Samuels. Attention and reading achievement in first grade boys and girls. Research Report #43. November 1972. (Journal of Educational Psychology, in press).

Research Report #59

Project No. 332189
Grant No. OE-09-332189-4533 (032)

ELABORATION AS AN INSTRUCTIONAL TECHNIQUE IN THE VOCABULARY DEVELOPMENT OF EMR CHILDREN

Arthur M. Taylor, Martha L. Thurlow, James E. Turnure[1]
University of Minnesota

Research, Development and Demonstration
Center in Education of Handicapped Children
Minneapolis, Minnesota

March 1974

The research reported herein was performed pursuant to a grant from the Bureau of Education for the Handicapped, U. S. Office of Education, Department of Health, Education, and Welfare to the Center of Research and Development in Education of Handicapped Children, Department of Special Education, University of Minnesota. Contractors undertaking such projects under government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official position of the Bureau of Education for the Handicapped.

Department of Health, Eduation and Welfare

U. S. Office of Education

Bureau of Education for the Handicapped

RESEARCH AND DEVELOPMENT CENTER
IN EDUCATION OF HANDICAPPED CHILDREN
Department of Special Education
Pattee Hall, University of Minnesota, Minneapolis, Minnesota 55455

The University of Minnesota Research, Development and Demonstration Center in Education of Handicapped Children has been established to concentrate on intervention strategies and materials which develop and improve language and communication skills in young handicapped children.

The long term objective of the Center is to improve the language and communication abilities of handicapped children by means of identification of linguistically and potentially linguistically handicapped children, development and evaluation of intervention strategies with young handicapped children and dissemination of findings and products of benefit to young handicapped children.

Abstract

Vocabulary instruction was developed which varied in the type of elaborations (relational vs. non-relational) and the type of summaries (thematic vs. non-relational) used. Three instructional conditions were tested: Relational (relational elaborations and thematic summary), Non-Relational (non-relational elaborations and non-relational summary), and Mixed (non-relational elaborations and thematic summary). Three classes of primary level EMR children were assigned to each condition, with a total of 107 children participating in the study. Analyses of data related to: a) vocabulary development and b) the utilization of instructional strategies, indicated that all conditions demonstrated increases in "specific" vocabulary development and that the utilization of instructional strategies varied with the conditions. The findings related to several specific hypotheses are presented. Evaluation of the three instructional conditions indicated that those receiving thematic summaries, the Relational and Mixed conditions, resulted in generally better performances. The recommendation for the approach to be used varied with the characteristics of the children being taught. Several suggestions for the development of elaboration-based vocabulary instruction for retarded children are presented.

Acknowledgements

This project benefitted from the input of many individuals. The technical assistance of Joni Blumenfeld, Roseshel Howe, and JoEllen Milstein was invaluable. These individuals constructed and administered tests, served as liasons to the nine classes involved, analyzed data, and assisted in the organization of the results.

Many individuals played crucial roles in the development of the vocabulary instruction. Dr. Douglas E. Wiseman (Principal, Child Development Center for Retarded Children, St. Paul Schools) provided much of the initial direction and impetus to the curriculum team. The bulk of the vocabulary instruction was written by two special education teachers from the St. Paul system (Jeanne Morrissey and Diana Bean), although the principle authors were actively involved in the writing. The hundreds of pictures for the instruction were drawn by Vida Neidorf, whose work was deeply appreciated. The audio-tapes were recorded by various individuals, including Ann Louise Taylor, Diana Bean, Ann B. DeGree, and Art Taylor.

The test construction and test administration activities also involved many individuals. Dr. Susan E. Whitely and Roseshel Howe coordinated the test construction, and several artists (Alice Riegel, Roseshel Howe, and Vida Neidorf) developed the pictorial stimuli for the tests. The bulk of the testing was done by Blumenfeld, Howe, Milstein, Thurlow, Taylor, Ruth Donahue, and Linda Johnson. In addition, all SORTS testing was supervised by Dr. R. Hunt Riegel, who provided much input to the study.

Finally, we owe a large debt of gratitude to the Special Education Department of the St. Paul Public Schools. Mr. Charles Hagen, Director of Special Education, provided continuous support and helped to organize the resources of the schools for the Vocabulary Development Project. Miss Helen Arbes and Mrs. Gloria Finger helped to provide inservice training and to generally coordinate the operations in the schools. And, most important, we sincerely thank the teachers and children who participated in the study.

TABLE OF CONTENTS

Page

Introduction. 1

Method. 6

Hypotheses. 13

Tests and Dependent Measures. 16

Results 21

Discussion. 29

References. 42

Footnotes 45

Appendices

A. A Sample Vocabulary Lesson 46

B. Tests. 56

Elaboration as an Instructional Technique in the Vocabulary Development of EMR Children

Arthur M. Taylor, Martha L. Thurlow, James E. Turnure[1]

with the technical assistance of
Joni Blumenfeld, Roseshel Howe, JoEllen Milstein

University of Minnesota

A frequent, and for the most part valid, criticism of psychological research is that it has had minimal impact on educational practices. One type of research which is often the target of such criticism is that involving the paired-associate (PA) learning paradigm (cf., Jenkins, 1971). Nevertheless, research utilizing the PA paradigm has led to the intensive investigation of "elaboration", a learning process that seems to have almost unlimited educational applications.

Research has revealed that the utilization of elaborative contexts enhances the PA performance of all learners, including very young children (Turnure, Larsen, & Thurlow, 1971) and retarded children (cf., Jensen & Rohwer, 1963; Turnure, 1971; Turnure, Larsen, & Thurlow, 1973). In fact, Rohwer (1973) has concluded that elaboration is the process necessary for efficient associative learning. Yet, if elaboration is such a remarkable process, and if elaboration has such potential for instructional usage, why is it that the emergence of elaboration has not caused an "instructional revolution?" One of the reasons for the minimal impact on educational practices must certainly be the issues pursued by researchers investigating

the elaborative process. That is, for the most part interest has focused on the effects of elaboration on the learner. A greater impact on educational practices might be obtained if the emphasis of current research was shifted to the instructional characteristics of elaboration. It seems that the most relevant research questions are those which strive for a better understanding of the types of teaching materials, as well as teaching techniques, that can be developed through the systematic utilization of elaboration.

Recently a few studies have demonstrated that elaboration and related cognitive strategies can be used as vehicles for very effective classroom learning. For example, Bender, Taylor, Riegel, and Turnure (1972) used elaboration and grouping strategies as a basis for developing social studies instruction, and Ross (1971) developed math concepts via elaboration [mediation] based instruction. The results from these studies provided convincing evidence that the systematic use of elaborative contexts can enhance instruction. Another study to determine the effectiveness of elaboration for facilitating classroom instruction was conducted by Ammon and Ammon (1971). In this study, elaboration-based instruction used to develop vocabulary was found to be far more effective than elaboration-based instruction used to develop syntax. These results are particularly interesting in that they were in direct opposition to Ammon and Ammon's initial hypothesis that elaboration was more related to syntax than to semantics. On the other hand, this finding was consistent with previous suggestions by Taylor (1970; Taylor, Josberger, & Knowlton, 1972) that training with an emphasis on elaborative contexts should represent a very effective method for facilitating vocabulary development.

One interesting aspect of elaboration is that it appears to be a frequent and naturally occurring process which plays a major role in most instruction. For example, if one were to survey all published language development and reading programs which include a vocabulary development component, one would certainly find that most rely extensively on elaborative contexts to facilitate vocabulary development. Thus, the major task confronting elaboration researchers is not to convince the practitioners to use elaborative contexts, but rather to delineate the ways in which elaborations can be used most effectively in instruction. For example, examination of how elaborative contexts are currently being used to develop vocabulary reveals a wide variety of methods, a common one being the use of elaborations to present the meaning of a single vocabulary word. Such usage appears unduly restrictive, and contrary to the consistent finding that elaboration facilitates learning mainly because it provides stronger relations between two words or concepts learned together in a single context (cf., Rohwer, 1971; Taylor, 1970; Turnure & Thurlow, 1973). Hence, a major purpose of the present study was to determine whether this conclusion from "basic" research applies when the material to be learned is interrelated vocabulary concepts rather than arbitrary paired-associates, or whether elaboration is more effective when used to convey the meaning of individual words without drawing relations between them.

One of the results of using the PA paradigm almost exclusively to investigate elaboration has been the unfortunate implication that an elaboration is merely a single sentence relating two nouns. As it is

used conversationally however, it seems that the term "elaborate" generally implies extensive verbal contexts, and recent research findings tend to suggest that elaboration may have even more impressive effects with such extended contexts. For example, Turnure (1971) demonstrated that a paragraph elaboration enhances PA learning more than elaborations that are simple sentences. In another study, Taylor and Whitely (1971) found that a single elaboration which integrated (related) four words was far more effective than separate paired elaborations. Recent research (cf., Bransford & McCarrell, 1972; Peterson, 1972) on "comprehension" has also indicated that instructions to integrate several words are particularly effective when the learner is given a theme around which he can integrate his elaboration. In a separate series of studies (Bower & Clark, 1971; Bain, 1972) it was clearly demonstrated that having adults generate "thematic" elaborations for 10 word serial lists resulted in almost perfect serial recall even after the subject had generated different thematic elaborations for 10 separate lists. It is important to note that in each of the above studies the elaboration involved some combination of verbal and pictorial (imaginal) processes, and that elaboration was not a purely verbal entity.

Pictures and verbal elaborations both played an important role in the vocabulary lessons developed by Ammon and Ammon (1971). Indeed, Ammon and Ammon's vocabulary instruction was almost completely in the form of thematic elaborations, with a substantial number of selected vocabulary words (approximately 10 per lesson) being introduced within a single story context.

A vocabulary project conducted in the St. Louis, Missouri Public Schools (cf. Draper & Moeller, 1971) also relied very heavily on thematic elaborations to develop and interrelate new vocabulary words. In this project the thematic elaborations were in the form of myths and fables, and were used as summaries at the end of a lesson. (The summaries also included dictionary definitions and characteristics of the 20 vocabulary words presented in each lesson.) However, these authors (Draper & Moeller, 1971) noted that when the vocabulary lessons were modified for use with younger children (fourth graders) they included only 8 words, which were taught in the same format (i.e., separate presentations of each vocabulary word summarized with a thematic myth or fable). Interesting enough, the fewer words presented to these children fall within the limits of the number of units which are traditionally thought to result in optimal organization of memory. For example, Miller (1956) refers to the "magical number 7 ± 2" as the number of different things that can be organized into a single memory chunk. Mandler (1967) has suggested that 5 ± 2 is a more realistic estimate of the number of things (for example, vocabulary words) that could be optimally organized into a single long-term memory unit. Thus, it would seem reasonable that the number of vocabulary words which should be integrated within a single thematic context falls within these limits.

For the present study, vocabulary instruction was developed which systematically varied the extent to which the relationships between five vocabulary words were presented in elaborations and in a summary. Specifically, two types of elaborations, "relational" and "non-relational," were compared in the present study, and were defined as follows:

Relational elaborations provide contexts which develop specific relationships between two or more vocabulary words.

Non-Relational elaborations provide contexts which expand on the meaning of a single vocabulary word, without relating it to the meaning of any other vocabulary word.

The two types of summaries used were called "thematic" and "non-relational," and were defined as follows:

Thematic summaries provide single integrative stories which emphasize a thematic relationship among the five lesson words.

Non-relational summaries provide five additional non-relational elaborations of the words presented in the lesson.

In addition to allowing for a systematic comparison of the effects of the two types of elaborations and the two types of summaries, the present study provided an opportunity to evaluate the effects of three specific instructional conditions. The three conditions (defined in the next section) are similar to instructional procedures one might find within the classroom, and the evaluation of the conditions should lead to specific recommendations for the development of vocabulary instruction.

Method

Design. All classes received vocabulary instruction containing both elaborations and summaries. The elaborations were the main element in the initial presentation of each word, and were of two types (relational or non-relational). The summary followed the presentation of the five words

in a lesson, and served to either integrate the relations among the five words or to provide separate non-relational elaborations. Since each class was to receive only one type of elaboration (relational or non-relational) and one type of summary (thematic or non-relational), there were four potential combinations permitted by the design (see Table 1). A limitation on the number of classes available for this study necessitated that only three of the four possible instructional treatment conditions be compared. The cell involving relational elaborations during initial presentation, and a non-relational summary, was considered to be an unrealistic instructional combination; therefore it was not used in the design of the present study. The remaining three instructional conditions were defined as follows:

> Relational. Elaborations were used to develop relations throughout the initial presentation of the vocabulary words, and the major relations were then integrated in a thematic summary.
>
> Mixed. Elaborations were used only to develop and expand the meaning of each individual vocabulary word during the initial presentation, but the major relations among these vocabulary words were then integrated in a thematic summary.
>
> Non-Relational. Elaborations were used only to develop and expand the meaning of each individual vocabulary word throughout the initial presentation, and similar non-relational elaborations were also presented in the summary.

It must be noted that the purpose of this study was both to compare these three conditions, and to evaluate the relative effectiveness of the two types of elaborations and the two types of summaries. Thus, on some of the dependent measures the Relational and Mixed conditions were compared with the Non-Relational condition (to evaluate the effects of thematic and non-relational summaries)

Table 1

Possible Instructional Treatment Conditions Resulting from Combinations of Two Types of Elaborations and Summaries

Types of Elaboration	Type of Summary: Thematic	Type of Summary: Non-relational
Relational	Relational	(not in study)
Non-relational	Mixed	Non-Relational

and on others the Relational condition was compared with the Mixed and Non-Relational conditions (to evaluate the effectiveness of relational and non-relational elaborations).

Subjects. All self-contained classes for primary age (generally, the range of CAs was from 8 to 10) EMR children in the St. Paul Public Schools were made available for this study. The nine classes which formed the final sample for the study were all drawn from "neighborhood" schools, as opposed to "special" schools.[2] All 107 children from these nine classes were pre-tested on two instruments, the Peabody Picture Vocabulary Test (PPVT), and the Minnesota Picture Vocabulary Test (MPVT), which is a criterion-referenced test for the vocabulary lessons (all tests are full described in a later section of the paper). The mean PPVT pre-test scores were used to assign the classes to the instructional treatment conditions. The procedures for assignment involved grouping the nine classes in blocks of three, such that one block contained the three classes with the highest mean PPVT scores, a second the three "middle" scores classes, and a third the three classes with the lowest means. Then, the three classes within each block were randomly assigned to the instructional treatment conditions. These assignment procedures not only resulted in similar mean PPVT pre-test scores for the three instructional treatment conditions, but also in very similar MPVT pre-test scores (see Table 2). The mean CA and IQ scores for each condition are also presented in Table 2.

Materials. Separate packages of materials existed for each lesson used to teach the vocabulary words. In all, materials were available for four weekly units, with each unit except one consisting of four daily lessons

Table 2

Means and Standard Deviations of IQ, CA, and Pre-test Scores of Subjects in Three Instructional Conditions

	Condition		
	Relational	Non-Relational	Mixed
IQ			
$\bar{X}$	74.9	74.4	73.8
SD	6.3	5.6	4.9
CA (years)			
$\bar{X}$	10.0	10.0	10.1
SD	0.7	0.7	0.6
PPVT* pre-test			
$\bar{X}$	31.00	32.19	31.79
SD	7.17	4.51	5.21
MPVT* pre-test			
$\bar{X}$	16.96	16.71	16.86
SD	2.21	2.43	1.99
N	38	28	41

*Peabody Picture Vocabulary Test (PPVT)

**Minnesota Picture Vocabulary Test (MPVT)

(one unit contained only three daily lessons). Five vocabulary words were taught in each lesson. The names of the units, lessons, and vocabulary words are presented in Table 3.

Each package of materials included a cassette tape recording of the lesson, a set of student texts (actually, books of pictures which the children followed while listening to the tape), sets of extra pictures which the children could keep, and a script of the tape lesson which the teacher could follow. A package of materials was available in each of the three conditions, but the content of the tapes and pictures varied in accordance with the experimental manipulations. As a result of the variation in the experimental conditions (as described below), the number of pictures each child saw and the length of the taped lessons also varied.

The development of the vocabulary lessons was controlled so as to minimize the confounding of the major research questions in the study. For this reason, the vocabulary lessons for each instructional condition were written in the same general format, and, except for the controlled differences between the instructional treatments, all lessons followed this general format. Each lesson was composed of three general sections --the Advance Organizer, the Word Presentations, and the Summary (see Table 4).

An "advance organizer" was used to begin each lesson, and its purpose was to introduce the children to the theme of the lesson. It also served the mechanical function of getting the children to attend simultaneously to the audio-tape and their picture books. However, since the same advance organizers were used for all conditions, including the Non-Relational Condition, the theoretical function of an advance organizer (to provide a pre-structure of relations; cf.,Ausubel, 1963) was not adhered to.

Table 3

Units, Lessons and Words Taught in All Conditions

THE CITY	WRITTEN WORD	MONEY	AIRPLANES AND AIRPORTS
1. Around the City	1. Kinds of Books	1. Exchange of Goods	1. Types of Airplanes
freeway	dictionary	equal	airliner
skyline	encyclopedia	trade	cargo
billboard	textbook	money	helcopter
traffic	storybook	buy	small plane
building	workbook	sell	seaplane
2. Walking in the City	2. Parts of a Book	2. U.S. Coins	2. Features of an Airport
block	title	penny	airport
pedestrian	table of contents	nickel	terminal
crosswalk	sentence	dime	hangar
curb	paragraph	quarter	control tower
corner	chapter	half dollar	runway
3. Buildings in the City	3. Kinds of Words	3. Paying for Things	3. People on an Airplane
skyscraper	noun	coins	passengers
firestation	verb	dollar	pilot
theater	pronoun	change	stewardess
parking ramp	adjective	check	cockpit
apartment building	compound word	cashier	hijacker
4. Things in the City	4. Punctuation Marks	4. Banking	
fire hydrant	period	bank	
traffic light	comma	save	
bus stop	exclamation point	borrow	
street sign	question mark	safe	
telephone booth	quotation marks	teller	

Table 4

General Format for Each Lesson

1. Advance Organizer (Introduction)
2. Word Presentations
    a. Pronunciation
    b. Definition
    c. Synonym
    *d. Elaborations

    (Steps a-d were repeated separately for each of the five words in a lesson.)

*3. Summary

*Only the nature of the elaborations and summaries was allowed to vary between conditions, with the remainder of the general format the same for all conditions.

The "word presentations" section contained the majority of instruction for each lesson. The word presentations were structured in such a way that all instruction about one vocabulary word was separate from the instruction about the remaining four vocabulary words from a lesson. That is, following the advance organizer the first word was presented, and after the first word was completed the second word was presented, and so on until the presentation of the fifth word was completed.

As shown in Table 4, there were four distinct parts to each word presentation. Three of these parts (the pronunciation, the definition, and the synonym) were the same for all instructional treatment conditions, only the elaborations varied between conditions. Although the four parts of the "word presentation" are shown as separate entities in Table 4, and were presented that way in the scripts for the teachers, the tape was continuous and the parts were not made obvious to the children.

The pronunciation part included a simple introductory statement which called the children's attention to the appropriate picture in their books. The tape pronounced the vocabulary word and had the children repeat the pronunciation in unison. The tape then immediately presented the definition of the vocabulary word. Whenever possible the definitions included a brief defining statement. Definitions were rarely presented in the abstract; usually a concrete example was presented with the definition. The tape always referred the students to a defining picture which was used to help point out critical features of the meaning of the vocabulary word. The definition always ended with the repetition of a brief defining statement.

If an obvious synonym for the vocabulary word existed, the tape presented this synonym in a short sentence, and the students were asked to repeat the sentence, replacing the synonym with the vocabulary word. Whenever such a replacement was called for, the teacher stopped the tape recorder while the class tried to construct (approximately) the same sentence. If no obvious synonym existed for the vocabulary word, then the tape restated the meaning with the suggestion that "this is the best word to use whenever you mean...."

The crucial difference in the elaborations used in the "word presentations" was whether or not they presented relations between vocabulary words. In two of the treatment conditions, the Non-Relational and the Mixed, all elaborative contexts expanded upon the word definitions without directly making any relational statements about any two vocabulary words. In the Relational condition, all major relations among the five vocabulary words were pointed out during the word presentation.

The relational and non-relational elaborations also differed in several ways. Specifically, the relational elaborations were shorter and usually did not include a story context, as did most of the non-relational elaborations. In addition, two non-relational elaborations were always presented, the second one requiring the children to generate or expand upon an elaboration. The pictures were also a source of variance between the two types of elaborations; the non-relational elaborations were accompanied by two pictures for each word (10 per lesson), whereas the relational elaborations included only one pictorial context per vocabulary lesson. The single picture depicted all five words from the lesson and was used with all relational elaborations, including the thematic summary.

The final section of the general format for the vocabulary lessons was the summary. Two of the three instructional conditions (Relational and Mixed) received thematic summaries. The summaries for these conditions contained an integrated story which was designed to emphasize several major relations among the five lesson words. Following the story, the tape reviewed the definitions of each of the vocabulary words. At the end of the lesson, it was stressed that if the student remembered the story (i.e., integration) it would help him remember the five vocabulary words. The summaries were identical for the two conditions receiving thematic summaries. On the other hand, subjects in the Non-Relational Condition received the same kind of elaborations in the summary as they did in the word presentations; of course, the five elaborations in the summary contained no relations between the words. The non-relational summary did include, however, the same review of the definitions that the other conditions received. (See Appendix A for an example of a vocabulary lesson, and the variations between conditions.)

Procedure. The procedures for each condition were the same. Each class was pre-tested on the PPVT, MPVT and the Sampling Organization and Recall Through Strategies (SORTS) tests. For each unit, the materials were packaged and delivered to the schools. Each unit took one week to complete, with lessons being given on the first three or four days of the week. A weekly test was given at the end of each unit (every Friday) by a trained tester.

Each lesson was conducted in approximately the same manner. As the children listened to the tape, they referred to their student texts or

special pictures. The teacher at this time was also following along with a copy of the script. The lessons took from 30 to 50 minutes per day, and the instruction was continuous for four weeks.

After all of the units were completed, each class was post-tested on the PPVT, MPVT, SORTS, and a fourth test, the Utilization of Vocabulary and Instructional Strategies Individualized Test (UVISIT). All tests are fully described in the section "Tests and Dependent Measures."

Hypotheses

Hypotheses were generated regarding: a) the vocabulary development of the children in the study, and b) their ability to utilize several strategies underlying the instruction.

Vocabulary Development Hypotheses

With respect to vocabulary development, it was expected that all instructional conditions would result in gains in both general vocabulary growth (as measured by a standardized test of vocabulary) and "specific" vocabulary growth (as measured by a criterion-referenced test of the vocabulary taught in the instruction). It was further expected that those conditions employing thematic summaries (Relational and Mixed Conditions) would show greater gains on measures of "specific" vocabulary growth than would the condition receiving non-relational summaries (Non-Relational Condition). With regard to the utilization of the vocabulary taught, it was hypothesized that an emphasis on relations during instruction should make the vocabulary words more available for long-term retention; thus the

subjects in the Relational and Mixed conditions were expected to show better performances on measures of long-term utilization of the specific vocabulary words taught. Because the conditions receiving non-relational elaborations (the Mixed and Non-Relational Conditions) were exposed to more varied contexts and more non-vocabulary nouns, it was further expected that measures of their word utilization would reflect greater use of non-vocabulary nouns.

Table 5 presents the specific hypotheses tested regarding vocabulary development, and the tests used to evaluate them.

Strategy Utilization Hypotheses

Due to the variations in elaborations and summaries, the subjects were exposed to quite different quantities of non-relational and relational statements. For example, the Non-Relational condition contained approximately 225 separate non-relational elaborations, while the Mixed Condition contained about 150 non-relational elaborations and the Relational condition did not contain any. The use of relations also varied extensively, with the Non-Relational having none, the Mixed Condition having 15 lesson summaries containing an unspecified number of relations, and the Relational condition having 75 separate relations plus the same substantial number of relations in the 15 lesson summaries. In light of these differences, it was expected that subjects in the conditions containing relational summaries (the Relational and Mixed conditions) would tend to produce contextual responses in the form of an integrated story more often than would subjects in the Non-Relational Condition. Furthermore, it was hypothesized that subjects in the Relational and Mixed conditions would be more likely to discover and utilize relations, with subjects in the Relational condition producing the most. On the other

Table 3

Specific Hypotheses and Tests: Vocabulary Development

Hypothesis	
1. All instructional conditions will enhance general vocabulary development.	Peabody Pict
2. All instructional conditions will result in gains in "specific" vocabulary growth.	Minnesota Pi (MPVT)
3. All instructional conditions will result in subjects recognizing an average of at least 80% of the vocabulary words correctly.	Weekly Pictu
4. Instructional conditions emphasizing thematic summaries (Relational and Mixed conditions) will show greater gains in "specific" vocabulary growth than will the Non-Relational Condition.	MPVT
5. Instructional conditions emphasizing thematic summaries (Relational and Mixed conditions) will result in subjects utilizing more of the vocabulary, in response to a picture containing representations of the vocabulary taught, than will the Non-Relational Condition.	Utilization Instruction Test (UVISI
6. Instructional conditions emphasizing non-relational elaborations (Mixed and Non-Relational conditions) will result in subjects repeating vocabulary words, when describing a picture containing representations of the vocabulary taught, more often than will the Relational Condition.	UVISIT, Par
7. The instructional condition emphasizing relational elaborations (Relational Condition) will result in subjects using fewer non-vocabulary nouns to describe a picture containing representations of the vocabulary taught than will the conditions emphasizing non-relational elaborations (Mixed and Non-Relational conditions).	UVISIT, Par
8. The instructional condition emphasizing relational elaborations (Relational Condition) will result in subjects using a higher proportion of nouns which are vocabulary words taught in the lessons than will the conditions emphasizing non-relational elaborations (Mixed and Non-Relational conditions).	UVISIT, Par

Table 5

Specific Hypotheses and Tests: Vocabulary Development

s	Test
ions will enhance general vocabulary development.	Peabody Picture Vocabulary Test (PPVT)
ions will result in gains in "specific"	Minnesota Picture Vocabulary Test (MPVT)
ions will result in subjects recognizing 0% of the vocabulary words correctly.	Weekly Picture Recognition Test
emphasizing thematic summaries (Relational ll show greater gains in "specific" vocabulary -Relational Condition.	MPVT
emphasizing thematic summaries (Relational ll result in subjects utilizing more of the to a picture containing representations of han will the Non-Relational Condition.	Utilization of Vocabulary and Instructional Strategies Individual Test (UVISIT), Part 1
emphasizing non-relational elaborations l conditions) will result in subjects ds, when describing a picture containing ocabulary taught, more often than will	UVISIT, Part 1
ion emphasizing relational elaborations ill result in subjects using fewer non- ribe a picture containing representations of an will the conditions emphasizing non-relational Non-Relational conditions).	UVISIT, Part 1
ion emphasizing relational elaborations ill result in subjects using a higher pro- re vocabulary words taught in the lessons emphasizing non-relational elaborations l conditions).	UVISIT, Part 1

hand, it was felt that subjects in the two conditions receiving non-relational elaborations would generate significantly more non-relational elaborations than would the subject in the Relational Condition.

Because all conditions contained the instructional strategy of definition, it was not hypothesized that subjects in anyone condition would utilize more definitional statements than the subjects in the other conditions. However, previous research (Haugen & McManis, 1971) has identified two distinct types of definitions (formal and functional) which seem to vary in the degree to which they utilize elaborational contexts to present a definition. Formal definitions emphasize physical characteristics and often tend to simply describe the object or event being defined, whereas functional definitions emphasize intrinsic features and tend to relate the function of the object or event to related objects or events. Since relational elaborations seem to be based upon this latter type of definition, it was hypothesized that the subjects in the Relational Condition would generate more functional definitions than subjects in either the Mixed or Non-Relational conditions.

Finally, several hypotheses were generated regarding the grouping strategies used by the subjects in the three conditions. Because the conditions employing relational summaries involved more grouping strategies, it was hypothesized that subjects in the Relational and Mixed conditions would generate more and better groupings, and that the exact nature of the groupings would vary with the conditions.

See Table 6 for the specific hypotheses tested regarding the utilization of instructional strategies, and the tests used to evaluate them.

Table 6

Specific Hypotheses and Tests: Strategy Utilization

Hypothesis	
1. Instructional conditions emphasizing thematic summaries (Relational and Mixed conditions) will result in subjects making more correct recognitions and fewer false recognitions when asked to group vocabulary items than will the Non-Relational Condition.	W
2. Instructional conditions emphasizing thematic summaries (Relational and Mixed conditions) will result in more subjects using integrated stories to describe a picture containing representations of the vocabulary taught than will the Non-Relational Condition.	U a S T
3. Instructional conditions emphasizing thematic summaries (Relational and Mixed conditions) will result in subjects discovering and utilizing relations, in response to a picture containing representations of the vocabulary taught, than will the Non-Relational Condtion.	U
4. Instructional conditions emphasizing thematic summaries (Relational and Mixed conditions) will result in more subjects generating higher-order categorical groupings than will the Non-Relational Condition.	S a g
5. Instructional conditions emphasizing non-relational elaborations (Mixed and Non-Relational conditions) will result in subjects utilizing more non-relational contexts to describe a picture containing representations of the vocabulary taught than will the Relational Condition.	U
6. Instructional conditions requiring the generation of non-relational elaborations (Mixed and Non-Relational conditions) will result in more subjects generating groupings that are associative in nature than will the Relational Condition (where subjects were not given experience in generating elaborations).	S
7. The instructional condition emphasizing relational elaborations (Relational Condition) will result in subjects generating more relational elaborations than will the conditions emphasizing non-relational elaborations (Mixed and Non-Relational conditions).	U
8. The instructional condition emphasizing relational elaborations (Relational Condition) will result in subjects generating more "functional" definitions than will the conditions emphasizing non-relational elaborations (Mixed and Non-Relational conditions).	U
9. The instructional condition emphasizing both the generation of elaborations and exposure to thematic summaries (Mixed Condition) will result in a smaller percentage of subjects reponding non-associatively than will the Relational and Non-Relational conditions (where subjects had only one experience or the other).	S

Table 6

cific Hypotheses and Tests: Strategy Utilization

	Test
sizing thematic summaries (Relational and Mixed conditions) more correct recognitions and fewer false recognitions items than will the Non-Relational Condition.	Weekly Grouping Test
sizing thematic summaries (Relational and Mixed conditions) sing integrated stories to describe a picture containing ary taught than will the Non-Relational Condition.	Utilization of Vocabulary and Instructional Strategies Individual Test (UVISIT), Part 2
sizing thematic summaries (Relational and Mixed conditions) ering and utilizing relations, in response to a picture the vocabulary taught, than will the Non-Relational Condtion.	UVISIT, Part 2
sizing thematic summaries (Relational and Mixed conditions) enerating higher-order categorical groupings than will the	Sampling Organizations and Recall Through Strategies Test (SORTS)
sizing non-relational elaborations (Mixed and Non-Relational jects utilizing more non-relational contexts to describe a ions of the vocabulary taught than will the Relational	UVISIT, Part 2
ring the generation of non-relational elaborations (Mixed will result in more subjects generating groupings that are l the Relational Condition (where subjects were not given rations).	SORTS
phasizing relational elaborations (Relational Condition) will more relational elaborations than will the conditions empha- ions (Mixed and Non-Relational conditions).	UVISIT, Part 2
phasizing relational elaborations (Relational Condition) will more "functional" definitions than will the conditions empha- ions (Mixed and Non-Relational conditions).	UVISIT, Part 2
phasizing both the generation of elaborations and exposure to ition) will result in a smaller percentage of subjects re- will the Relational and Non-Relational conditions (where ce or the other).	SORTS

Tests and Dependent Measures

Several tests and dependent measures were used in the present study to evaluate the hypotheses of interest. The PPVT, MPVT, and Weekly Picture Recognition tests were used mainly to provide measures of vocabulary development; the UVISIT, SORTS, and Weekly Grouping tests were used primarily to investigate the children's utilization of instructional strategies. The characteristics of each of these tests are presented below.

Peabody Picture Vocabulary Test (PPVT)

The PPVT (Dunn, 1961) was used to provide an indication of the general vocabulary development of the children. No attempt was made to utilize the PPVT as an IQ test, and the only score obtained from each administration of the PPVT was the number of items recognized correctly. For the present study, the PPVT was adapted for group administration, which required that all subjects be tested on the same subset of items (Form B, #32-#75). The group administration was conducted by having each subject point to the "correct" picture in his book of PPVT plates as a word was read, and then mark the corresponding box on a separate score sheet.[3] Extensive training and monitoring by four proctors were used to minimize the number of errors made in this transfer to the separate score sheet.[4]

The 44 items of the PPVT were administered as both a pre- and post-test, and served as the only measure of "general" vocabulary development. Administration procedures and a list of the PPVT items are included in Appendix B.

Minnesota Picture Vocabulary Test (MPVT)

The MPVT is a criterion-referenced test that was modeled after the group administration version of the PPVT described above. The MPVT contained 27 items; two each from 13 of the 15 daily lessons, one from another lesson, and none from the remaining lesson. The pictures used in this test were drawn by different artists than the pictures in the lessons themselves in order to minimize direct transfer from the instruction. The MPVT was also administered both pre- and post-, and served as an indication of "specific" vocabulary growth. The procedures for administering the MPVT are also appended (see Appendix B).

Weekly Tests

Weekly Tests were given each Friday, after the four daily lessons had been given on Monday through Thursday, and were used mainly to check for differences in the effectiveness of the instructional conditions for each unit (the tests were not used as pre-tests). As with the MPVT, all test items were drawn by a different artist than the one drawing for the lesson. Each weekly test had two parts-- picture recognition and grouping. The procedures for administering both parts of the weekly tests are also included in Appendix B.

The first part of each weekly test, the Weekly Picture Recognition Test, was patterned after the PPVT, and required the child to identify pictures of the vocabulary words taught during the week's instruction. The test was given orally, and the child had to mark a picture in a test booklet.

The second part of each weekly test was the Weekly Grouping Test. This test was designed to evaluate the child's ability to remember all

words taught in a given lesson, and required the child to respond to arrays containing 8 ± 1 pictures. For each array, five pictures were representations of the vocabulary words from one daily lesson and the others were either intra- or extra-unit intrusions. One of the five key pictures was selected as the stimulus and presented to the children with the name of the lesson from which it had been selected. The children were asked to think about that lesson, and then were to mark the other pictures that showed words they had learned on the same day. One such array was used to test each daily lesson. Sample test pages and instructions are included in Appendix B. It should be noted at this point that the Grouping test was difficult, and more than likely required several other skills (e.g., reconstructive memory, categorization, and ability to transform pictures to the words they represent). Because of this drawback, the task was considered to provide a relatively conservative measure of the learner's ability to systematically access words.

Utilization of Vocabulary and Instructional Strategies Individual Test (UVISIT)

The experimental UVISIT was developed as part of this study to fulfill two needs. First, it provided an indication of whether the subjects could utilize the vocabulary words to spontaneously describe a picture. Second, it elicited contextual responses for telling a story about a picture, a means by which the utilization of instructional strategies could be identified.

After other testing was completed, the UVISIT was administered to 54 of the 107 subjects in the study; these subjects included the six subjects from each class for whom the most complete data were available. Since most of the UVISIT was based on the first instructional unit, a necessary condition for selection was that the subject had been present for this instruction and testing. It should be noted that the UVISIT was administered approximately one month after all instruction on the first unit was completed. Other criteria for selection included MPVT and PPVT pre- and post-test scores. If more than six subjects from a school met these criteria, the six receiving the UVISIT were determined randomly.

The UVISIT was handled as a structured interview in which the subject was given a topic and encouraged to talk without experimenter interruption. After a brief warmup, the subject was interviewed on the first part of the UVISIT. The complete set of instructions for the experimenter is included in Appendix B.

The two parts of the UVISIT both utilized a picture of a city scene. A photographic reduction of this picture is presented in Figure 1, with the original picture used in the test being 60 cm x 48 cm. The UVISIT picture included representations of all 20 vocabulary words from the City Unit, but there was no control on the salience of the words represented. The first part of the UVISIT interview was designed primarily to determine how many of the 20 vocabulary words the subjects would utilize. Noun responses to this part of the test were tabulated and counted as either vocabulary words or other nouns. In this way the

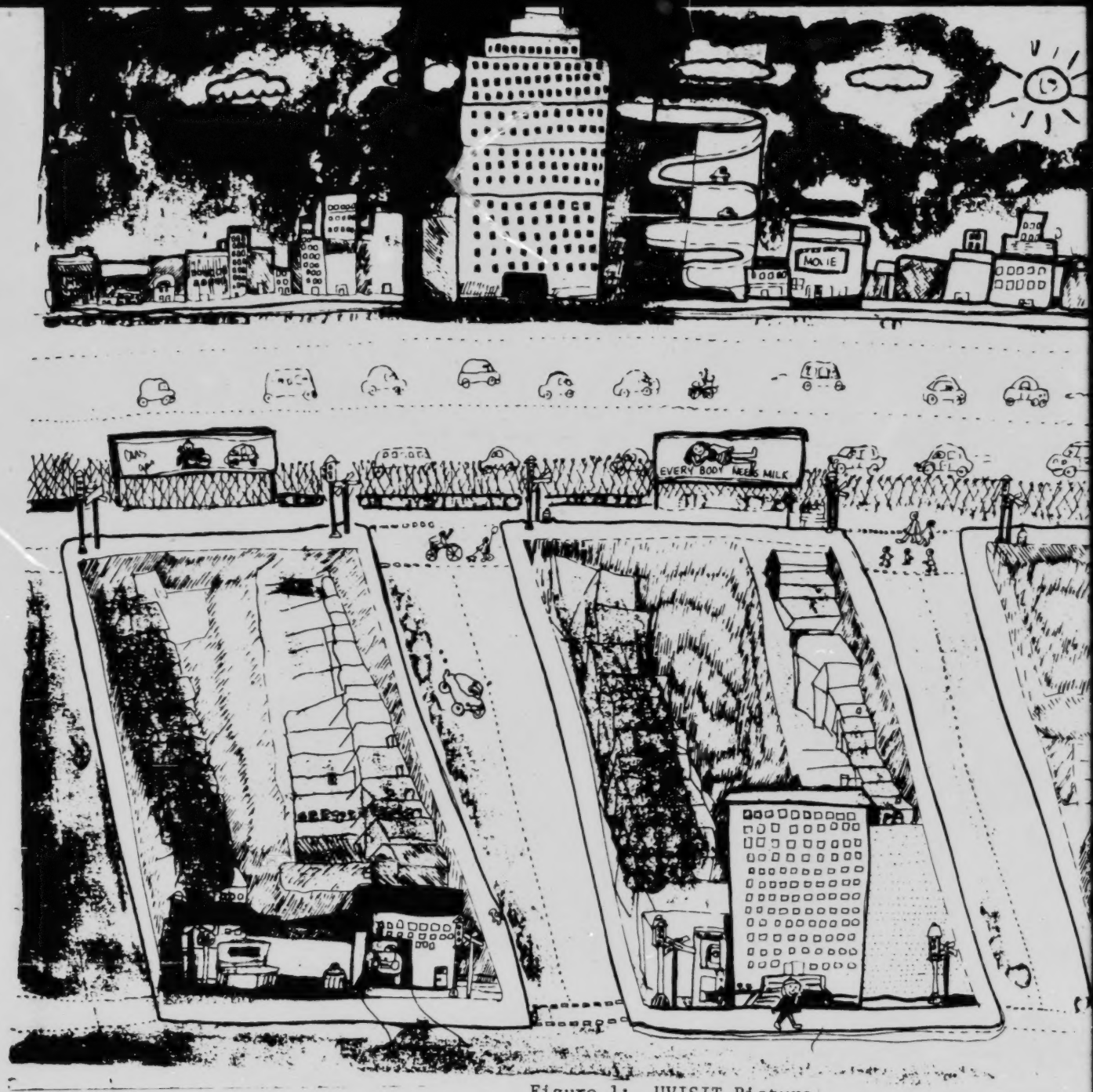


Figure 1: UVISIT Picture

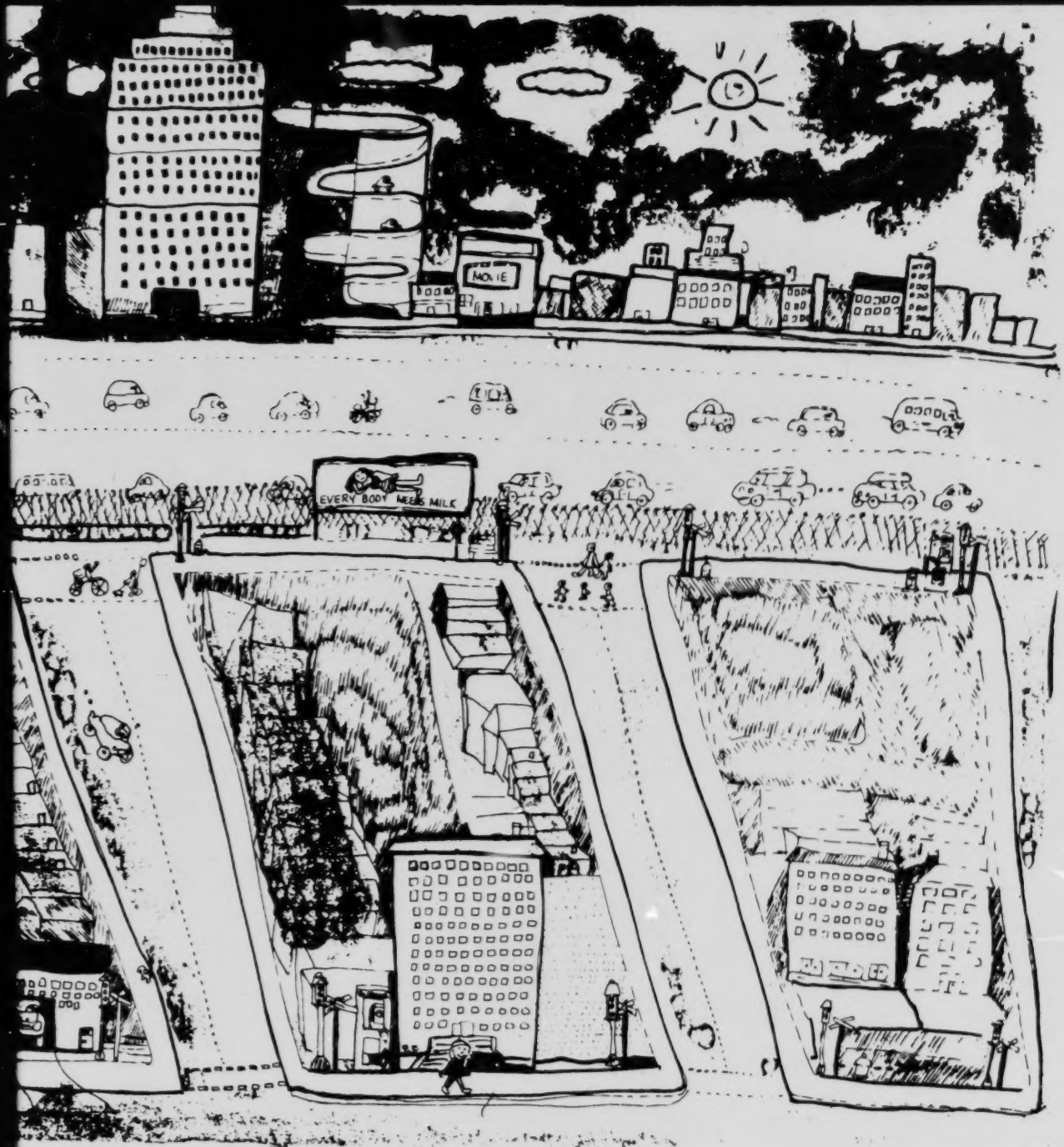


Figure 1: UVISIT Picture

number of vocabulary words utilized and the relative percentage of noun responses which were vocabulary words could easily be computed.

The second part of the UVISIT was used to investigate the types of contextual responses which the subjects utilized to describe the picture. All responses which contained vocabulary words were classified as either naming, definitional, non-relational elaboration, or relational elaboration. In addition, each subject's overall response to this part of the UVISIT picture was judged as to whether or not it was an integrated story. In order to insure that a sufficient number of contextual responses would be given, specified prompts were utilized to generally encourage definitional, elaborative, and relational responses.

Sampling Organization and Recall Through Strategies (SORTS) Test

The SORTS test (Riegel, 1973) utilizes children's sorting responses, interview techniques and recall protocols in order to derive three basic scores. The sorting level score, which is based on the type of groups formed by the subject when sorting an array of 20 pictures, and his reasons for those groupings, was the only score of interest in the present study. In determining the sorting level score, each of the subject's sorting responses is classified as either syncretic (groupings based on spatial contiguity, an attempt to make an unrelated spatial design, or no strategy at all), perceptual (groupings based on attributes of color, size, or shape), associative (groupings based on intrinsic or semantic attributes), or categorical (groupings based on a single intrinsic attribute of the items or on category membership). In the

present study, the child's sorting level score was classified as either non-associative (syncretic or perceptual), associative, or categorical. Complete definitions and descriptions of the sorting levels may be found in Riegel and Taylor (1973).

The SORTS test was employed in the present study to measure the effects of exposure to thematic summaries (in the Relational and Mixed conditions) and the effects of requirements to generate elaborations (in the Non-Relational and Mixed conditions) on the grouping abilities of the children.

Results*

Analyses of Vocabulary Development

(PPVT). The PPVT was the only measure of general vocabulary development. Since the classrooms were matched across conditions on pre-test PPVT scores, the change in scores from pre- to post-test was used as an indication of vocabulary development (see Table 7). As the means in Table 7 indicate, only the Relational condition showed the expected significant gain from pre- to post-test [$t(28) = 1.80$, $p < .05$]. Thus, the hypothesis that all conditions would show general vocabulary development (see Table 5, Hypothesis 1) was not supported. Neither the Non-Relational nor the Mixed Condition showed increases which were significant.

MPVT. The MPVT pre- and post-test mean percentage correct scores

*One-tailed tests of significance were used on all results where specific hypotheses were made a priori.

Table 7

Mean PPVT Pre-test, Post-test, and

Gain Scores for Each Condition

	Condition		
	Relational	Non-Relational	Mixed
Pre-test	31.00	32.19	31.79
Post-test	33.55	32.23	32.68
Gain	2.55	.04	.89

Table 8

Mean Percent Correct Recognition for Each Condition

on MPVT Pre-test, Post-test, and Gains

	Condition		
	Relational	Non-Relational	Mixed
Pre-test	62.4	61.9	62.5
Post-test	83.0	83.6	83.7
Gain	20.6	21.7	21.2

are presented in Table 8 for the three instructional conditions. Since the classrooms had also matched across conditions on MPVT pre-test scores, no significant differences were present at pre-testing (all conditions correctly recognized about 62% of the MPVT pictures). Table 8 reveals the remarkably similar post-test means for the three conditions, with each condition correctly recognizing about 83% of the MPVT pictures after vocabulary instruction. Although there were no significant differences between conditions (i.e., Hypothesis 4, Table 5, was not supported), there was an obvious gain from the pre- to the post-test for all conditions. Repeated measures t tests were performed on the data for each condition, and the gains for the Relational [$t(27) = 11.77$, $p < .001$], Mixed [$t(29) = 15.07$, $p < .001$], and Non-Relational [$t(20) = 7.91$, $p < .001$] conditions were found to be highly significant; thus, Hypothesis 2 (Table 5) was supported. It should be noted further that the MPVT scores of some subjects on the post-test were restricted by the ceiling of 27 correct recognitions, a situation which suggests that the instructional gains may be underestimated in the MPVT.

Weekly Picture Recognition Tests. Hypothesis 3 states that, "All instructional conditions will results in subjects recognizing an average of a least 80% of the vocabulary words correctly." As the percentages in Table 9 indicate, the actual results were very close to this expected level. More specifically, on two of the weekly tests (i.e., City and Money unit tests) the subjects in all conditions exeeded this 80% criterion, whereas the results for the Airplane Unit

Table 9

Mean Percent Correct for Each Condition on

Four Weekly Picture Recognition Tests

	Condition		
	Relational	Non-Relational	Mixed
Weekly Test:			
City	84.2	81.2	80.6
Written Word	59.5	62.5	61.9
Money	89.7	92.9	93.1
Airplanes	81.1	73.3	81.6
Average	78.6	77.5	79.3

revealed that only two of the conditions (Relational and Mixed conditions) reached the 80% level. On the other hand, the results for the Written Word Unit provided no support for Hypothesis 3 since each of the conditions averaged only about 60% correct recognition. Thus, on three of the four Weekly Picture Recognition Tests, Hypothesis 3 was supported, with the 80% criterion being generally obtained in all conditions.

The mean percentages shown in Table 9 were also used to test the hypothesis that conditions emphasizing thematic summaries (Relational and Mixed conditions) would show greater "specific" vocabulary growth than the Non-Relational Condition. This hypothesis (see Table 5, Hypothesis 4) received no support from the analyses of the first three units; however, analysis of the results for the Airplane Unit did obtain statistical significance [$t(94) = 2.66$, $p < .01$], with the subjects in the Relational and Mixed conditions correctly recognizing approximately 8% more of the vocabulary words than subjects in the Non-Relational Condition. In summary, of five separate tests of Hypothesis 4 (i.e., the MPVT plus the four Weekly Picture Recognition Tests), only one provided statistical support.

UVISIT, Part 1. The data from the first part of the UVISIT was used to indicate the extent to which subjects could utilize the vocabulary correctly. The mean numbers of different vocabulary words from the first week's instruction (maximum = 20) used by subjects in the de-

scription of the UVISIT picture (see Figure 1) are presented in Table 10. As predicted (see Table 5, Hypothesis 5), subjects in the Mixed and Relational conditions utilized significantly more different vocabulary words to describe the UVISIT picture than did subjects in the Non-Relational Condition [$t(52) = 1.80$, $p < .05$].

Hypothesis 6 (Table 5), which posited that subjects in the non-relational elaboration conditions (Mixed and Non-Relational conditions) would repeat the vocabulary words more often than subjects in the Relational Condition, was tested by investigating the mean number of times vocabulary words were repeated in the three conditions. A planned comparison revealed that subjects in the Mixed and Non-Relational conditions repeated vocabulary words significantly more ($\bar{X} = 1.88$) than did subjects in the Relational condition [$\bar{X} = 1.41$; $F(1,51) = 4.09$, $p < .05$]. Thus, Hypothesis 6 was supported.

The relative dominance of the vocabulary words was investigated by comparing the numbers of vocabulary nouns (including repetitions) and non-vocabulary nouns used by subjects in their descriptions of the UVISIT picture (see Table 10). Planned comparisons to test the hypothesis that vocabulary words were relatively more dominant in the descriptions of the subjects in the Relational Condition (see Table 5, Hypothesis 8) was supported [$F(1,51) = 3.79$, $p < .05$]. The hypothesis that this dominance was due to the use of significantly fewer non-vocabulary nouns by these subjects (see Table 5, Hypothesis 7) was also supported [$F(1,51) = 7.58$, $p < .01$].

Table 10

Mean Number of Vocabulary and Non-Vocabulary Noun

Responses Utilized in Descriptions of UVISIT Picture

	Condition		
	Relational	Non-Relational	Mixed
Different Vocabulary Words	5.55	4.83	6.06
Repetitions of Vocabulary Words	1.41	1.85	1.91
Total Vocabulary Words (including repetitions)	7.83	8.94	11.60
Non-Vocabulary Words	7.94	15.50	18.67
Total Noun Responses	15.77	24.44	30.27
Vocabulary Dominance (Total Vocabulary/ Total Nouns)	49.6%	36.6%	38.3%

Analyses of the Utilization of Instructional Strategies

Weekly Grouping Tests. The mean percentages of pictures correctly grouped on each of the four Weekly Grouping tests are presented in Table 11. Separate *t* tests were conducted for each test to determine if subjects in the conditions receiving thematic summaries (Relational and Mixed conditions) were better able to group pictures of the vocabulary words according to the lessons within which they were presented than were subjects in the Non-Relational Condition (see Table 6, Hypothesis 1). Three of these four tests revealed significant differences which supported the hypothesis [City: $t(89) = 3.56$, $p < .01$; Money: $t(89) = 1.90$, $p < .05$; Airplanes: $t(94) = 1.68$, $p < .05$]. Furthermore, the Relational and Mixed conditions were not found to be significantly different from each other on any of the Weekly Grouping tests.

UVISIT, Part 2. The complete response that each subject gave to the UVISIT picture was scored as to whether or not it represented a single integrated (i.e., thematic) story. The proportion of subjects giving an integrated story in each condition is presented in Table 12. As hypothesized (See Table 6, Hypothesis 2), a significantly greater proportion of subjects in the two conditions receiving thematic summaries (Relational and Mixed conditions) told an integrated story about the UVISIT picture than in the Non-Relational condition ($z = 1.74$, $p < .05$).

Table 11

Mean Percent of Pictures Grouped Correctly in Each Condition on Four Weekly Grouping Tests

	Condition		
	Relational	Non-Relational	Mixed
Weekly Test:			
City	70.9	55.9	69.0
Written Word	92.7	90.0	89.2
Money	76.2	74.4	81.2
Airplanes	80.1	75.9	80.1
Average	80.0	74.1	79.6

Table 12

Utilization of Instructional Strategies in Response to the UVISIT Test by Subjects in Each Condition

	Condition		
	Relational	Non-Relational	Mixed
Dependent Measures:			
Percentage of subjects giving Integrated Stories	28%	11%	39%
Mean Number of Relational Elaborations	1.18	1.11	1.33
Mean Number of Non-Relational Elaborations	1.22 (SD=1.16)	1.89 (SD=1.67)	3.44 (SD=3.43)

Table 12 also presents the mean number of relational elaborations used to describe the UVISIT picture by the subjects in the three conditions. As suggested by these means, the number of relational elaborations did not differ with the conditions, and thus, the data failed to support the hypothesis that subjects in the Relational and Mixed conditions would utilize significantly more relations than the subjects in the Non-Relational condition (see Table 6, Hypothesis 3). Clearly, subjects in the Relational condition did not produce the greatest number of relational elaborations (see Table 6, Hypothesis 7).

Finally, Table 12 shows the mean number of non-relational elaborations utilized by the subjects in the three treatment conditions. Orthogonal t tests were used to test the hypothesis that subjects receiving non-relational elaborations (Mixed and Non-Relational conditions) would utilize significantly more non-relational elaborations than subjects in the Relational condition (see Table 6, Hypothesis 5). The significant difference found [$t(52) = 2.08$, $p < .05$] provided support for this hypothesis. However, inspection of Table 12 suggested that this difference might be related to the large number of non-relational elaborations utilized by the subjects in the Mixed condition. This possibility was confirmed by the remaining orthogonal t test, which revealed a significant difference between the means for the Mixed and Non-Relational conditions [$t(34) = 1.68$, $p < .05$]. In fact, the large standard deviation in the Mixed Condition probably restricted the level of significance obtained. Further inspection of the individual subject scores in the Mixed Condition

revealed an extremely skewed distribution, with four subjects generating more non-relational elaborations than any subjects in either of the other two conditions.

As Table 13 indicates, the subjects in the Relational Condition utilized more definitional statements to describe the UVISIT picture than did subjects in the other conditions; however, this difference failed to approach significance [$t(52) < 1.0$]. The large standard deviation found for the Relational Condition resulted from ten of the subjects in that condition using no definitional statements, whereas the remaining 8 subjects averaged more than four definitional statements each.

A further breakdown into the type of definition revealed that all conditions resulted in about the same number of formal definitions. However, as expected (see Table 6, Hypothesis 8), the subjects in the Relational Condition did appear to utilize substantially more functional definitions than did the subjects in the other conditions. This difference did not obtain significance [$t(52) = 1.43$], largely because only an average of 61% of the subjects produced any functional definitions. When the data from just those subjects producing some type of definitional statement were analyzed, however, the subjects in the Relational Condition were found to produce significantly more functional definitions ($\bar{X} = 3.75$) than subjects in the other conditions [$\bar{X} = 1.44$; $t(22) = 3.3$, $p < .01$].

Table 13

Mean number of Subjects' Definitional Responses in Each Condition

	Condition		
	Relational	Non-Relational	Mixed
Number of Definitions			
$\bar{X}$	2.11	1.33	1.50
SD	2.78	1.74	1.42
Type of Definitions			
Formal	.44	.44	.56
Functional	1.67	.89	.94

SORTS. The pre- and post-test mean sorting levels for the children in each of the conditions are presented in Table 14. It was expected that the random assignment of classes to conditions would result in no significant difference in the percentage of subjects performing at each of these levels on the pre-test. Tests for differences between proportions revealed that the relatively small differences shown in the upper portion of Table 14 were indeed non-significant (zs < 1.0). Since no significant differences were found in the pre-test percentages, the three hypotheses related to sorting level performance (see Table 6, Hypotheses 4, 6, and 9) were tested directly on the post-test percentages, which are presented in the lower portion of Table 14.

The hypothesis that more of the children in the conditions receiving non-relational elaborations (Non-Relational and Mixed conditions) would generate associative groupings than subjects in the Relational Condition (See Table 6, Hypothesis 6), was supported (z = 2.14, p < .05), by a test of the differences between proportions (Bruning & Kintz, 1968). As the data in Table 14 suggest, approximately the same proportion of subjects in the Non-Relational (27%) and Mixed (29%) conditions grouped on associative bases, as compared to less than 10% of the subjects in the Relational Condition.

As indicated in Table 14, substantially more of the subjects in the Relational (29%) and the Mixed (32%) conditions responded to the post-test with categorical level groupings than in the Non-Relational condition (19%). However, the proportion test calculated on the post-

Table 14

Pre- and Post-test Percentages of Subjects responding Non-associatively, Associatively and Categorically to SORTS Test in Each Condition

	Condition		
	Relational	Non-Relational	Mixed
Pre-Test SORTS level			
Non-Associative	65.5	61.5	60.5
Associative	18.8	23.1	18.4
Categorical	15.6	15.4	21.1
n	32	26	38
Post-Test SORTS level			
Non-Associative	61.3	53.8	38.7
Associative	9.7	27.0	29.0
Categorical	29.0	19.2	32.3
n	31	26	31

test data relevant to the hypothesis that proportionately more of the subjects in the Relational and Mixed conditions would generate categorical groupings than in the Non-Relational Condition (see Table 6, Hypothesis 4) was found to be non-significant ($z = 1.20$).

The final hypothesis related to the post-test sorting level data was that a significantly smaller proportion of subjects in the Mixed Condition would group non-associatively than in the other conditions (see Table 6, Hypothesis 9). This hypothesis was also supported by the data presented in Table 14, with less than 40% of the subjects in the Mixed Condition responding non-associatively; a test of the two proportions indicated that the difference was significant ($z = 1.74$, $p < .05$). The hypothesis was further supported by the fact that only the Mixed condition showed a large decrease in the number of subjects responding non-associatively from the pre-test to the post-test (60.5% to 38.7%). The test of the difference between these two proportions was found to be significant ($z = 1.95$, $p < .05$). On the other hand, the relatively small decreases from pre-to post-test in the other conditions failed to approach significance ($zs < 1.0$).

Discussion

This study represents an important link between laboratory research on learning strategies (such as elaboration) and new approaches to instructional development based on these same learning strategies.

Although previous laboratory studies of elaboration have done much to help refine our knowledge of this important learning process, it seems that much can also be learned about the elaboration process by manipulating it in more realistic, yet controlled, studies.

The discussion of this particular study is divided into four sections. The first two sections are directly related to the hypotheses tested about the utilization of instructional strategies (see Table 6) and the development of vocabulary (see Table 5). The third section discusses the relative strengths and weaknesses of each of the three instructional conditions, and the final section provides suggestions for the development of future elaboration-based vocabulary instruction for retarded children.

Utilization of Instructional Strategies

The UVISIT test was designed to directly measure the use of non-relational and relational elaborations, and the results from it are quite interesting. First, it provided strong support that instruction based on a heavy diet of non-relational elaborations (as in the Mixed and Non-Relational conditions) will result in subjects utilizing significantly more non-relational elaborations as descriptive statements. The relationship between the number of elaborations presented to subjects and the number of elaborations utilized in later test situations does not appear to be a direct one, however, since subjects in the Mixed Condition received about two-thirds as many non-relational elaborations as those in the Non-Relational Condition, and yet utilized

about twice as many non-relational elaborations to describe the UVISIT picture (see Table 12). Unfortunately, the instructional treatments did not have the same effect on all subjects within a condition, with four subjects in each of the three conditions failing to utilize any elaborative statements to describe the UVISIT picture.

Non-relational elaborations were defined, for the purposes of both the instructional manipulation and scoring the UVISIT protocols, as contexts which expand upon the meaning of a single vocabulary word without relating that word to a second vocabulary word. Such "elaborations" on single words are obviously important in learning, as well as language development, but possibly a more important function of elaborations is to provide meaningful relationships between two or more words (or concepts). The instruction for subjects in the Relational Condition was designed almost completely around such relational elaborations, and therefore it was expected that subjects in the Relational Condition (and to a lesser extent those in the Mixed Condition) would utilize a substantial number of relational elaborations (statements relating two or more vocabulary words) to describe the UVISIT picture. However, the analysis of the protocols from the UVISIT test revealed that relational elaborations were seldom used by any of the subjects, with no significant differences across conditions (also see Table 12).

An inspection of the UVISIT picture reveals one possible explanation for the general failure of subjects to utilize relational elaborations. Although designed to show representations of the vocabulary words in a single context, the picture appears to present few easily observable relationships between two or more of the vocabulary words (see Figure 1). In addition, it would seem that the unexpected failure of subjects in the Relational Condition to generate relational elaborations may have resulted from the fact that their instructional condition did not provide them with much experience in describing relations, whereas the test required such descriptions.

A potential problem with picture interview tests such as the UVISIT arises in the development of a valid and reliable coding system. Although very high inter-rater reliabilities were noted in scoring the UVISIT protocols, no reliability data was collected. The face validity of the coding system developed for the UVISIT test appeared to be high, however, in that the scoring system reflected the instructional strategies which were manipulated (i.e., relational elaborations, non-relational elaborations, thematic stories, and definitions). However, alternative coding systems are numerous. For example, a system which classifies the subjects' responses as naming, conjunctive, locational, functional, or as verbal expansion seems very promising. This alternative system seems more consistent for the types of responses given to the UVISIT picture, and further it seems to be more meaningful to a broader group of researchers and practitioners than the present coding system.

One of the major manipulations in this study involved the type of summary presented with each daily lesson. Two of the conditions (Relational and Mixed conditions) presented a thematic summary, which was intended to integrate the five words in the daily lesson into a single, easy to remember form. In contrast, the other condition (Non-Relational Condition) merely presented more non-relational elaborations, with no attempt to integrate the five words. If the presentation of thematic summaries had any effect on the children, it would seem that this effect would show up in the tests most directly related to instruction, and so it did. As previously noted in the description of the Weekly Grouping Tests, these tests probably required memory, integrative, and classification skills for successful performance. Thus, it was not surprising that subjects who had received thematic summaries, which were an attempt to develop these same skills, performed significantly better on three of the four Weekly Grouping Tests than did subjects in the Non-Relational Condition.

The UVISIT test provided a second index of whether subjects from the Relational and the Mixed conditions utilized their experience with thematic summaries. All children given the UVISIT test were asked to make up a <u>story</u> to describe the UVISIT picture of the city, and each of the protocols was scored to determine if the subject actually used a "story format" to describe the picture. It was expected that significantly more of the subjects who had been exposed to such integrative stories in the summaries would use such stories in their own responses.

Although only one-third of the subjects from the Relational and Mixed conditions were classified as having used such a story format, this figure proved to be significantly higher than that for the Non-Relational Condition.

Beyond these immediate effects of presenting thematic summaries, it was further hypothesized that systematic exposure to such summaries would influence the child's general approach to learning. The results from the SORTS test were somewhat equivocal as to whether thematic summaries had such a general effect. Substantially, but not significantly, more of the subjects from the Relational and Mixed conditions were found to generate categorical groupings, which were similar in nature to the types of relations presented in the thematic summaries. Thus, although transfer was not clearly demonstrated, the basic hypothesis that the presentation of thematic summaries would enhance the memory for the instruction was given considerable support.

Vocabulary Development

A second major thrust behind the study was to delineate the effects of elaboration on the development of vocabulary. In this regard, one purpose of the present study was to replicate the Ammon and Ammon (1971) finding, that elaboration facilitates vocabulary development, with a substantially different population - educable mentally retarded children. The fact that subjects in all conditions showed considerable growth in specific vocabulary development was clearly demonstrated in the results of the Weekly Picture Recognition Tests and the MPVT

post-test. It was also hypothesized that the subjects in each of the conditions would show a significant growth in general vocabulary development (see Table 5). However, the data showed that only one condition (Relational Condition) made such gains on the PPVT, which was the only measure of general vocabulary development used in the study. Despite the fact that the effects of the vocabulary instruction failed to generalize to other vocabulary for the most part, it seems clear that the EMR children definitely benefitted from the elaboration-based approaches to vocabulary development.

Another hypothesis about vocabulary development was inferred from the findings of previous basic research on elaboration (cf., Rohwer, 1971; Taylor, 1970; Turnure & Thurlow, 1973), and particularly from the previous study of the effects of elaboration on vocabulary development (Ammon & Ammon, 1971), that the conditions emphasizing relational and thematic elaborations should facilitate vocabulary development more than conditions emphasizing non-relational instruction (as in the Non-Relational Condition). In five separate tests of this hypothesis using measures of picture recognition (the MPVT and the Weekly Picture Recognition Tests), only one provided statistical support. In general, it seems that all instructional conditions were equally effective in enhancing picture recognition of the vocabulary.

The final measure of picture recognition was the PPVT, which was administered as both a pre- and post-test in order to determine whether any general vocabulary development occurred as a result of the month-long instructional intervention. However, as noted, the analyses

revealed that only the subjects in the Relational Condition showed a significant increase in the recognition of the selected items from the PPVT. Whether this significant gain in PPVT performance signifies that only subjects in the Relational Condition developed general vocabulary skills is not clear, but some support for this interpretation is available from other indicies in the present study. For example, it was found that the subjects in the Relational Condition gave substantially more "functional" definitions when asked to tell a story about the UVISIT picture. It seems likely that this greater use of functional definitions was a direct outgrowth of the emphasis on functional relations that was prominent in the elaborations presented in the Relational Condition.

Nation (1971) has previously pointed out the weaknesses of using only recognition measures of vocabulary development, and he has particularly stressed the importance of obtaining measures of vocabulary utilization. Such measures of expressive communication typically involve several methodological problems (cf., Ammon & Ammon, 1971), with meaningful indices of vocabulary utilization being particularly difficult to obtain on pre-tests. Although the limited availability of the required methodology at pre-testing time made it impossible to obtain baseline data, the study did contain one measure of vocabulary utilization, as part of the UVISIT post-test. The results of the UVISIT test supported the hypothesis that an emphasis on thematic summaries would result in significantly greater utilization of the vocabulary words.

Since tests of vocabulary utilization require individualized testing, they are more expensive and time consuming than measures of picture recognition. However, the data obtained from such tests are critical, and it seems that every effort must be made to develop the methodology necessary for obtaining reliable measures of expressive communication.

Evaluation of the Three Instructional Treatment Conditions.

Up to this point, the results, as well as the discussion of this study have been presented so as to highlight the specific manipulations employed (i.e., the type of elaborations and summaries), and not the overall effect of each condition taken as a whole. But, it cannot be denied that the combination of elaborations and summaries that defined each condition is indeed important. Thus, the results will be reviewed so as to interpret the implications for each of the three conditions.

Non-Relational Condition. The subjects in this condition were the only ones exposed to totally non-relational elaborations. That is, all contexts presented in the elaborations and the summaries were designed so as not to make any relational statements about any two vocabulary words. As a result of this "bombardment" type of approach, the subjects in the condition performed essentially as well as subjects in the other two conditions on most measures of specific vocabulary development. But, as expected, they performed less well on each of the indices of strategy utilization than either the Mixed Condition, the Relational Condition, or both conditions, depending on the specific dependent measure.

In short, there is not even one measure on which the Non-Relational Condition can be considered the strongest of the three conditions.

Mixed Condition. The particular combination of non-relational elaborations and thematic summaries in the Mixed Condition in many ways seemed to provide the best of both worlds. However, on only three dependent measures did the subjects in the Mixed Condition significantly outperform those in the Relational Condition. These dependent measures (the total number of vocabulary words utilized in response to the UVISIT picture, the number of non-relational elaborations utilized in describing the UVISIT picture, and the fewest non-associative responses to the SORTS test) seem to have in common both an associative learning factor and a vocabulary utilization factor. It seems that the opportunity to generate their own elaborations provided by the manner in which the non-relational elaborations were manipulated, taken in combination with the thematic summaries, resulted in the enhanced elaborative ability of the subjects in the Mixed Condition.

Relational Condition. The specific combination of relational elaborations and thematic summary relationa provided to the subjects in the Relational Condition seemed to provide an emphasis on functional relational techniques rather than on elaboration. In particular the subjects in this condition performed quite differently to the UVISIT test, where they utilized: a) the most functional definitions, b) the fewest non-relational elaborations, c) the fewest extraneous (non-vocabulary) nouns, and d) the highest proportion of vocabulary responses. In addition, the significant gain

on the PPVT demonstrated only by the Relational Condition suggests that this instructional treatment did indeed result in the development of some very important vocabulary development skills.

Finally, the set of findings indicating that although the Relational and Mixed conditions surpassed the Non-Relational Condition on both measures of organization and memory (the Weekly Grouping tests and SORTS test), there was no difference between these conditions, strongly suggests that only the exposure to thematic summary relations that was shared by these conditions had any effect on the development of organization and memory skills. In many ways, the effects from the systematic presentation of thematic summary relations found in the present study seem to parallel the effects found with a month-long intervention intended to facilitate the development of grouping and other memory skills by young EMR children (cf., Riegel, Danner, & Taylor, 1972).

Suggestions for the Development of Future Elaboration-based Vocabulary Instruction for Retarded Children

1. It is not clear whether instruction like that found in the Relational Condition or Mixed Condition is most effective for vocabulary development. Most likely, the approach selected should vary depending on the characteristics of the children being taught:

   a. For children with deficits in expressive communication and/or vocabulary utilization, the Mixed approach is unquestionably the best.

   b. For children who are hyperactive, distractable, or otherwise "disorganized" it would seem the more controlled Relational approach would be most appropriate.

c. For most children, it would seem that a blending of the two approaches, it which they are presented with both types of elaborations, given adequate opportunity to generate elaborations, and provided with thematic summary relations, should provide optimal instruction.

2. It would seem that concrete words are far easier to develop with elaboration-based instruction than are more abstract vocabulary words.

a. Those words selected for the "Written Word Unit" (see Table 3) proved to have the least satisfactory results as measured both by pupil performance and the opinions of the classroom teachers.

b. Social studies type topics such as the present units on the City and Airplanes (see Table 3) seem to be particularly adaptable to the elaboration approach to vocabulary development.

c. Vocabulary topics that are related to skill development (e.g., Money Unit) seem to need teacher-directed activities, as well as the elaboration-based vocabulary lessons, if both the skills and the vocabulary are to be developed.

3. The combination of pictorially presented elaborations, and description provided through an audio-tape, seems to be excellent for this population.

a. The instruction is greatly enhanced when the pictures are simple, "easy to read," and present only a single context or relation.

b. The audio-tape in an approach such as this must be extremely flexible, so that the teacher has the option of stopping the tape when necessary.

c. The effectiveness of the approach seems to be enhanced when the teacher is provided with both the pictures and a copy of the tape script.

d. This approach bypasses reading and thus allows more age-appropriate vocabulary words to be presented. Yet, individual teachers could integrate reading into the instruction where it is appropriate for their children.

4. Five new vocabulary words are too many to be introduced within one vocabulary lesson using any systematic elaboration approach to instruction.

a. This suggestion is made mainly because of time constraints, in that twenty to thirty minute lessons would seem to be the optional length for this population.

b. Two (or three at the most) new vocabulary words seem to result in the optimal length elaboration-based lesson, in which adequate development of definitions and relations can be made.

c. If previously developed vocabulary words (i.e., ones which have been defined and elaborated upon) are to be later integrated, it would seem that five words would result in an appropriate length lesson containing only summary relations.

5. A single tape lesson on a word, as in the present study, is often inadequate for developing important concepts.

a. Teacher-directed follow-up activities can be used to review or expand upon the meaning of vocabulary words and concepts.

b. Such "post-activities" could also be used to develop math skills based on the vocabulary.

c. Only one definition of a word should be presented within a single lesson. Thus, words with multiple definitions (such as "a penny is the only brown coin," "the penny buys less than all the other coins," and "a penny is one cent") will require several lessons to teach.

6. There is a need for improved testing methods and devices in order to identify the current competencies of the children and to sequence instruction.

a. Tests of expressive and receptive vocabulary should be given to demonstrate gain scores.

b. All instruction and testing should be derived from appropriate behavioral objectives.

c. Every attempt must be made to measure the development of skills as well as the development of vocabulary.

References

Ammon, P. R., & Ammon, M. S. Effects of training black preschool children in vocabulary versus sentence construction. Journal of Educational Psychology, 1971, 62, 421-426.

Ausubel, D. P. The psychology of meaningful verbal learning. New York: Grune & Stratton, 1963.

Bain, J. D. Separation of imaginal and verbal components of a narrative mnemonic. Paper presented at the Symposium on Mental Imagery conducted during the Seventh Annual Convention of the Australian Psychological Society, Canberra, 1972.

Bender, N. N., Taylor, A. M., Riegel, R. H., & Turnure, J. E. Variations of strategy training and the applications of strategies in teaching retarded children. Paper presented at the annual meeting of the American Educational Research Association, Chicago, 1972.

Bower, G. H., & Clark, M. C. Narrative stories as mediators for serial learning. Psychonomic Science, 1969, 14, 181-182.

Bransford, J. D., & McCarrell, N. S. A sketch of a cognitive approach to comprehension: Some thoughts about understanding what it means to comprehend. A symposium paper presented at the Conference on Cognition and Symbolic Processes, Pennsylvania State University, 1972.

Bruning, J. L., & Kintz, B. L. Computational handbook of statistics. Atlanta: Scott, Foresman & Co., 1968.

Draper, A. G., & Moeller, G. H. We think with words. Phi Delta Kappan, 1971, 482-484.

Dunn, L. G. The Peabody Picture Vocabulary Test. American Guidance Service, Circle Pines, Minnesota, 1961.

Haugen, D. M., & McManis, D. L. Training and transfer of word definitions by retarded children. American Journal of Mental Deficiency, 1972 76, 594-601.

Jenkins, J. J. Second discussant's comments: What's left to say? Human Development, 1971, 14, 279-286.

Jensen, A. R., & Rohwer, W. D., Jr. The effect of verbal mediation on the learning and retention of paired-associates by retarded adults. American Journal of Mental Deficiency, 1963, 68, 80-84.

Mandler, G. Organization and memory. In K. W. Spence & J. T. Spence (Eds.), The psychology of learning and motivation. Vol. 1. New York: Academic Press, 1967.

Miller, G. A. The magical number seven, plus or minus two: Some limits on our capacity for processing information. Psychological Review, 1956, 63, 81-97.

Nation, J. E. A vocabulary usage test. Journal of Psycholinguistic Research, 1972, 1, 221-231.

Peterson, R. C. A cognitive approach to imagery. Unpublished doctoral dissertation, University of Minnesota, 1972.

Riegel, R. H. Sampling organization and recall through strategies: Administration and scoring manual. Research, Development and Demonstration Center in Education of Handicapped Children, University of Minnesota, 1973.

Riegel, R. H., Danner, F. W., & Taylor, A. M. Steps in sequence: Training educationally handicapped children to use strategies for learning. Development Report #2. Research, Development and Demonstration Center in Education of Handicapped Children, University of Minnesota, Minneapolis, 1972.

Riegel, R. H., & Taylor, A. M. A comparison of conceptual strategies for grouping and remembering employed by EMR and non-retarded children. Research Report #46. Research, Development, and Demonstration Center in Education of Hanicapped Children, University of Minnesota, Minneapolis, 1973.

Rohwer, W. D., Jr. Prime time for education: Early childhood or adolescence? Harvard Educational Review, 1971, 41, 316-341.

Rohwer, W. D., Jr. Elaboration and learning in childhood and adolescence. In H. W. Reese (Ed.), Advances in child development and behavior. New York: Academic Press, 1973, in press.

Ross, D. Retention and transfer of mediation set in paired-associate learning of educable retarded children. Journal of Educational Psychology, 1971, 62, 322-327.

Taylor, A. M. Visual imagery instruction and action versus nonaction situations relative to recall by children. Final report of U.S. Office of Education grant #OE6-5-9-245030-0023, May, 1970.

Taylor, A. M., Josberger, M., & Knowlton, J. Q. Mental elaboration and learning in EMR children. American Journal of Mental Deficiency, 1972, 77, 69-76.

Taylor, A. M., & Whitely, S. E. Imagery and verbal elaboration, organizational factors and children's recall. Paper presented at the biennial meeting of the Society for Research in Child Development, Minneapolis, 1971.

Turnure, J. E. Types of verbal elaboration in the paired-associate performance of educable mentally retarded children. American Journal of Mental Deficiency, 1971, 76, 306-312.

Turnure, J. E., Larsen, S. N., & Thurlow, M. L. Syntactic elaboration in the learning and reversal of paired-associates by young children. Research Report #7. Research, Development and Demonstration Center in Education of Handicapped Children, University of Minnesota, Minneapolis, 1971.

Turnure, J. E., Larsen, S. N., & Thurlow, M. L. Effects of brain-injury and other subject characteristics on paired-associate performance under paragraph elaboration. American Journal of Mental Deficiency, 1973, 78, 70-76.

Turnure, J. E., & Thurlow, M. L. Verbal elaboration and the promotion of transfer of training in educable mentally retarded children. Journal of Experimental Child Psychology, 1973, 15, 137-148.

Footnotes

[1]The first author, Arthur M. Taylor, is now Supervisor of Programs for the Mentally Retarded in the St. Paul Public School System. His address is: Special Education Department, MR Programs, St. Paul Public Schools, 360 Colborne, St. Paul, Minnesota 55103.

[2]Schools which contained "regular" classes in addition to one or two "special" classes were classified as "neighborhood" schools. Children in the special classes in these schools generally represented the higher functioning EMR population, i.e., those children whom it was hoped might be able to return to a "regular" class. "Special" schools were those which contained only classes for mentally retarded children. The children in these schools included the lower range of the EMR population, who, because of their lower functioning and associated problems, were considered less likely to return to a "regular" class.

[3]The authors wish to thank the American Guidance Service for the loan of the dozen sets of PPVT plates used in this study.

[4]The use of four monitors would have been prohibitive if the EMR children had not quickly caught on to the group testing procedure employed with the PPVT, MPVT, and Weekly Tests. By the third testing session, generally only one monitor was needed in each class.

Appendix A

A Sample Vocabulary Lesson

NOTE: This appendix contains one example of a vocabulary lesson used in the study ("Buildings in the City" from the City Unit). The general format was the same for the three instructional conditions (Relational, Non-Relational, and Mixed). The variations in the types of elaboration (relational or non-relational) and in the types of summary (thematic or non-relational) are noted in the appendix, and the specific wordings for each variation are included.

Buildings in the City

Advance Organizer: Today we are going to learn the names of five buildings. Remember, buildings are places where people live or go to do things. All the buildings we will learn today are in the downtown part of the city. And, if you go downtown, you should be able to see all of these buildings.

* *

Variation: Relational condition (additional paragraph in Advance Organizer)

Take the picture out of the back of your books and put it down beside your book. (Pause) This picture shows the downtown part of the city; and, all the buildings we are going to talk about today are in this picture. We will talk about the fire station, the apartment buildings, the theaters, the skyscraper, and the parking ramp. Each of these buildings is in the downtown part of the city that is in your special picture.

* *

SKYSCRAPER: Okay, let's begin now. Open your book of pictures and look at the first picture. (Pause)

1. The first word we are going to learn today is "skyscraper". Can you find the word "skyscraper" on your paper? (Pause) Circle the word "skyscraper". (Pause) Now, you say "skyscraper". (Pause)

2. The big building in your picture is called a skycraper because it is a very, very tall building. It is taller than all the other buildings downtown. Point to the tops of all the buildings in town except the skycraper. (Pause) Now point to the top of the skyscraper. (Pause) See how much taller it is? A skyscraper is a very, very tall building.

3. "Big building" and "tall building" are words that mean the same thing as "skyscraper". See if you can change this sentence so it has the word "skyscraper" in it. "The 'big building' was the tallest building in town." (Pause for children to say "The 'skyscraper' was the tallest building in town.")

* *

Variation: Non-Relational and Mixed conditions (after synonym [#3], these conditions presented two non-relational elaborations)

4. Turn to page 2 now and look at the picture of the skyscraper. This skyscraper is so tall that its top is hidden by the clouds. Can you see the skyscraper? (Pause) Can you see all of it?

That's right, we can't see all of this building because part of the top is hidden by clouds. It is a very tall building. What do we call this building? (Pause) Did you say "skyscraper"? Good.

5. Turn to page 3 now. This picture is funny looking isn't it! This skyscraper has hands and is reaching into the sky! Even though real skyscrapers don't have hands like the one in the picture, they still look like they are reaching up into the sky because they are so tall. Close your eyes and think about a real skyscraper reaching into the sky. (Pause)

Variation: Relational Condition (after synonym [#3], this condition presented a relational elaboration)

4. Now look over at your picture with all the buildings in it. (Pause) This picture shows the downtown part of the city, and only one of the buildings in this picture is a skyscraper. Point to the skyscraper. (Pause) The skyscraper is the tallest building downtown, and it is much taller than all the other kinds of buildings we are going to talk about today. It is taller than the theaters, the parking ramp, the apartment buildings, and the fire station too!

* *

FIRE STATION: Okay, now turn to the next picture in your book of pictures. (Pause)

1. The building in this picture is a "fire station". Its name is made up of two words: "fire" and "station". Can you find the words "fire station" on your paper? (Pause) Circle the words "fire station". (Pause) Now, you say "fire station". (Pause)

2. A <u>fire station</u> is a place we call if we need firemen to help us. We can tell the building in this picture is a fire station because we can see the fire trucks in the doors. Point to the fire trucks. (Pause) A fire station is a place where we call or stop if we need firemen to help us.

3. Another word that means the same thing as fire station is "fire house". Here is a sentence with the word "fire house" in it; change it so it has the word "fire station" in it. "The 'fire house' was empty." (Pause for children to say "The 'fire station' was empty.")

* *

Variation: Non-Relational and Mixed conditions (after synonym [#3], these conditions presented two non-relational elaborations)

4. Now turn to page 5 so you can look at another picture of a fire station. Can you see what is happening in this picture? The fire station is empty because all the firemen and fire trucks are at a house that is on fire. They are busy trying to put out the fire. Point to the fire trucks. (Pause) They aren't at the fire station, are they? Now point to the building where the fire trucks stay when they aren't at a fire. (Pause) What is the name of this building? (Pause) Good, the people who live in the house that is on fire probably called the fire station to get the firemen to come and put out the fire.

5. Turn to page 6 and look at the picture. This picture shows the inside of a fire station. Let's see if you can make up a story about what is happening in the fire station. Your teacher will stop the tape now so you can all make up a story. [Teacher stops tape and first gets children to pick out relevant features in picture - man sliding down pole, others running to engines; possible story - firemen getting ready to go to a fire.]

Variation: Relational Condition (after synonym [#3], this condition presented a relational elaboration)

4. Now look over at your picture with all the buildings in it again. See if you can find the fire station in this picture. (Pause) Be sure you are pointing to the building with the fire trucks in it. This building is the fire station. A fire station is the place where people call or stop when they need firemen to help them. People in any of the other buildings in the downtown part of the city, like the skyscraper or the theater, could call the fire station if they needed help from firemen.

* *

THEATER: Okay, let's talk about another word now. Look at the next picture in your picture book. (Pause)

1. It shows a "theater". Can you find the word "theater" on your paper? (Pause) Circle the word "theater".

2. A <u>theater</u> is a building where people go to see movies. The picture you are looking at shows the outside of a theater. Point to the place where you pay to go see a movie. (Pause) Good, it is in front of this theater. A theater is a building where people go to see movies.

3. Sometimes people call a theater a "movie house". Theater means the same as movie house. See if you can change this sentence so it has the word "theater" in it. "Let's go to the movie house." (Pause for children to say, "Let's go to the 'theater'.")

* *

Variation: Non-Relational and Mixed conditions (after synonym [#3], these conditions presented two non-relational elaborations)

4. Now turn to page 8. This theater is full of people watching the movie. There is a big movie screen in front of the theater and all the people can see it from their seats. Point to the movie screen. (Pause) Can you see how full the theater is? (Pause) All the seats have people in them. What do we call this building where people go to watch movies? (Pause) Did you say "theater"? Good.

5. Turn to the next picture in your book now. It is on page 9. This time you are going to make up a short story about this picture. Try to make up a story that tells about the theater and the long line of children in front of it. Your teacher will stop the tape now so you can all make up a story about the picture [teacher stops tape and guides children to make up a story which relates the theater, the line of children, and the idea that the theater is a place where the kids are going to see a movie - perhaps something like, "The kids were in a long line in front of the theater."]

Variation: Relational Condition (after synonym [#3], this condition presented a relational elaboration)

4. Now look at your picture with all the buildings in it. There are three theaters in the downtown part of the city in this picture. See if you can point to all three of them.(Pause) These buildings are the places where people go to see movies.

* *

PARKING RAMP: Turn to the next page now so you can see a new picture. (Pause)

1. This building is a parking ramp. "Parking ramp" is made up of two words: "parking" and "ramp". Can you find the words "parking ramp" on your paper? (Pause) Circle them. (Pause) Now, you say "parking ramp". (Pause)

2. A ramp is a walk or road that goes from one floor to another, so a parking ramp is a building where cars are parked on many floors that are connected by ramps. The parking ramp in your picture shows the ramp the cars go on and the floors where the cars are parked. Point to the ramp that the cars go on the get from one floor to another. (Pause) Now, point to the top floor of the parking ramp. (Pause) Do you see all the cars parked there? (Pause) The building in this picture is a parking ramp. A parking ramp is a building where cars park on many floors, and the floors are connected by ramps.

3. Other words that mean the same thing as parking ramp are "car ramp", or just plain "ramp". Now, put the word "parking ramp" where it goes in this sentence: "They left their car in the 'ramp'." (Pause for children to say, "They left their car in the 'parking ramp'.")

* *

Variation: Non-Relational and Mixed conditions (after synonym [#3], these conditions presented two non-relational elaborations)

4. Good, now turn to page 11. This picture shows another parking ramp. You can't see the ramp where the cars go from one floor to another because it is hidden behind a wall. But you can still tell it is a parking ramp because you can see all the cars parked on the top floor. This parking ramp isn't very tall, but it still can hold many cars because it covers a whole city block. What is the name of this building that cars park in? (Pause) Did you say "parking ramp"? Good.

5. Now look at page 12 and listen while I tell you about this picture. "The parking ramp was so full of parked cars that no more cars could park there. Even the ramp was filled with cars trying to get into the parking ramp and no more cars could go up it." Close your eyes now and think about the picture. Try to remember the story that goes with the picture. (Pause)

Variation: Relational Condition (after synonym [#3], this condition presented a relational elaboration)

4. Good. It should be easy for you to find a parking ramp in the downtown part of the city now. Look over at your picture with all the buildings in it. (Pause) Now point to the parking ramp. (Pause) This is the building where cars park on many floors that are connected by ramps. All the other buildings we talked about today were buildings that people go into to do things, but a parking ramp is a little different. A parking ramp is a building where people keep things. People keep their cars in parking ramps while they aren't driving them.

* *

APARTMENT BUILDING: Okay, turn to the next page at look at the picture.

1. This building is an apartment building. "Apartment building" is made up of two words: "apartment" and "building". Can you find the words "apartment building" on your paper? (Pause) Circle them. (Pause) Now, you say "apartment building". (Pause)

2. An apartment building is a place where many families live. Each family in an apartment building lives in a separate group of rooms. The apartment building in this picture is a big one, but apartment buildings can be big or small. An apartment building is a place where many families live.

3. Another word that means the same as "apartment building" is "apartment house". Listen to this sentence with the words "apartment house" in it and change it so it has the words "apartment building" in it. "The 'apartment house' was very big and old." (Pause for children to say, "The 'apartment building' was very big and old.")

* *

Variation: Non-Relational and Mixed conditions (after synonym [#3], these conditions presented two non-relational elaborations)

4. Now turn to page 14 and look at the picture carefully while I tell you about it. The street in this picture has many apartment buildings on it, but they are not all the same. One is very new and fancy. Point to it. (Pause) Now point to the very tall building. (Pause) It is so tall that many families can live in it. Now point to the building in the middle of your picture. (Pause) It looks like many apartment buildings - it has many windows and just one door. Even though these buildings look different, they are all places where many families live. What do we call these buildings? (Pause)

5. Okay, now turn to page 15. This picture shows some more apartment buildings. All of these apartment buildings are on one street. See if you can tell your teacher something about these apartment buildings. [Stop tape; teacher should guide children to tell how all the apartment buildings on the street look the same].

Variation: Relational Condition (after synonym [#3], this condition presented a relational elaboration)

4. Good. Now look at your picture that shows all the buildings again. (Pause) Apartment buildings can look very different from each other, but see if you can find some apartment buildings

in this picture. Point to the buildings that look like apartment buildings to you. (Pause) Remember, apartment buildings are buildings where many families live.

* *

Variation: Relational and Mixed conditions (after all words had been presented, these two conditions presented a thematic summary of the five words - called an "integration". The introduction to the integration varied for the two conditions only slightly in wording in the first four sentences. The wording presented here is that used in the Mixed Condition)

Integration: Turn to the next page in your book now. It is page 16, and there is no picture on it. Put away your papers with the new words on them. Today we learned the names of five kinds of buildings in the city. See how many of these five words you can remember now. (Pause). Did you remember all of them? (Pause). Okay, take the picture out of the back of your book. You can keep this picture when we are finished with it. This picture shows all the buildings we learned today. Now here is a story to help you remember the picture and all the buildings. Listen carefully and try to see what's happening.

Mrs. Smith rushed to the phone and called the fire station. She was in a hurry because the apartment building she lived in was on fire. As soon as the firemen answered the phone, she screamed "Hurry, come quickly! My apartment building is on fire!" "Wait a minute," the fireman said. "There are a lot of apartment buildings in this city. Where is your apartment building?" Poor Mrs. Smith didn't know the names of the streets around her apartment building, but she did know where the fire station was, so she told the fireman how to get from the fire station to her apartment building. Before we hear how Mrs. Smith told the fireman to get to her apartment building, I want you to put an X on all the apartment buildings in the city. [Teacher stops tape and children mark the apartment buildings]. There are a lot of apartment buildings in the city, aren't there? Now, listen carefully to the directions Mrs. Smith gave the fireman, and see if you can find the apartment building that is on fire. First of all, Mrs. Smith told the fireman to go past the three theaters - they are all on the same street. Then, she told them to turn left onto a street. "When you do this," she said, "you'll see three buildings. One of the buildings is a skyscraper, and another is a parking ramp, but the building I'm in is an apartment building, and it is on fire! It is between the skyscraper and the parking ramp." Did you follow Mrs. Smith's directions from the fire station past the three theaters to the apartment building? Good. You can't see that this apartment building is on fire in your picture, so put some flames on it. This way, the firemen will be able to see which building is on fire. (Pause)

All the new words we learned today were in this story about the fire. Let's talk about each word again now, and I will ask you some questions about them.

Point to the building in your picture where fire trucks stay when they aren't at a fire. What is the name of this building? (Pause--"fire station"). Good, a fire station is a place where we call or stop if we need firemen to help us.

Now, point to the buildings that Mrs. Smith lives in. What do we call this building? (Pause--"apartment building"). Right, we call it an apartment building because many families can live there.

Okay, now look at your picture and find the buildings that you could go to if you wanted to see a movie. What do we call these buildings? (Pause--"theaters"). That's right, a theater is a building where people go to see movies.

Point to the building in your picture that is the tallest building. It is the building that is taller than all the other buildings in the city. What is the name of this building? (Pause--"skyscraper"). Right, it is called a skyscraper because it is a very, very tall building.

Now, point to the building where cars park on many floors. What do we call this building? (Pause--"parking ramp"). A parking ramp is a building where cars can park on many floors, and the floors are connected by ramps.

Okay, now use the picture and story to remember the five new words we learned today.

* *

Variation: Non-Relational Condition (after all words had been presented, this condition presented a non-relational summary of the five words)

Extra Elaborations: Turn to next page in your book now. It is page 16, and there is no picture on it. Put away your papers with the new words on them. Today we learned the names of five kinds of buildings in the city. See how many of these five words you can remember now. (Pause). Did you remember all of them? (Pause). Okay take the loose pictures out of the back of your book. You can keep these pictures when we are finished with them. Each of the pictures shows one of the buildings we learned today, and I will tell you a story about each one to help you remember the picture and all the buildings.

Look at your first picture now. It shows a very, very tall building - a skyscraper. Point to the little boy standing at the bottom of this huge skyscraper. (Pause). He is looking way up, trying to see the skyscraper. Pretend you are this little boy. When you stand at the bottom of a skyscraper and look up, everything looks so big, and the top looks so very far away. Even if you aren't very little, you really feel small when you stand next to a skyscraper and look up at it!

Okay, now turn to page 2. This building is a fire station. "Fire station" was the second word we learned today. People usually call a fire station to get the fireman to come and put out a fire. But look at your picture! The firemen in this picture are putting out a fire, but look where the fire is ! It is in the fire station! Nobody had to call the firemen to come and put out a fire; they were already at the building that was on fire!

Let's turn to page 3 now. This picture shows a "theater", the place where people go to watch movies. Here is a little story about what is happening in this picture. The two little boys are trying to sneak into the theater so they can watch the special movie that is showing. Everybody had been talking about the movie that was going to be at the theater, and the two little boys really wanted to see it. But, they didn't have any money to pay to get into the theater. So, they decided to sneak into the theater by crawling on their knees. The little boys can't see him, but there is a big man standing right by the door they are crawling up to. The man is smiling though. Can you guess why? (Pause). Look at the sign on the movie picture - it says "Free movie today!" What do you think will happen when the two little boys run into the man? Your teacher will stop the tape now so you can tell her what will happen [Story may tell the man is laughing because the boys don't have to sneak in, the man might scare the boys, but they will get to see the movie].

Good, now look at your next picture on page 4. This picture is about the fourth kind of building we learned today. It is a place where cars park on many floors and drive from one floor to the next on ramps. We call it a parking ramp. The parking ramp in your picture is really full and it looks like its time for everyone to go home. Point to all the cars that are on the ramps of this parking ramp. (Pause). They are all trying to get down to the street so they can go home, but there is so much traffic in the street that none of the cars are moving very much!

Okay, now let's look at page 5. The building in this picture is an apartment building. It is a place where many families live. The apartment building in your picture is not very big, but its not real small either. Let's see if you can figure out how many families live in this apartment building. Look at the front of the building; every place you see a window, there is one family living there. Count the windows on the front of this building now and tell your teacher how many families live in this apartment building (Pause--children should find that there are 12 or 16 families living in the building, the number will depend upon whether or not they count the blocks on the first floor as windows).

Good. Now look at all five pictures again and see if you can remember the names of all the buildings we learned today.

Appendix B

Tests

Peabody Picture Vocabulary Test (PPVT)

Instructions and Items Used in Group Administration

Instructions for Group Administration:

Hi! My name is _____. Today we are going to play a picture game with you.

On your desks, you have a book of pictures, an answer sheet booklet, and a yellow cover sheet. [Show each as it is mentioned.] Now, take your pencil and write your name on the cover of the answer sheets. Good!

Okay, let's turn to the first page of your answer sheets. All the pages in this booklet are the same. There are four boxes on each page, but we only want to look at one box at a time. Now, take your yellow cover sheet, and cover all of the boxes on the page except box number 1. Like this [demonstrate]. Good!

Now take your book of pictures and put it next to your answer sheet booklet. These picture books that you are using are not ours, and they are very expensive, so please be very careful with them. Do not make any marks in them. Okay, you can open your picture book now. Turn to page 1. It looks like this [show large book]. Be sure you are only looking at page 1. You can see that there are four places on this page, and each one has a picture in it. Now, box #1 on your answer sheet looks just like page #1 in your picture book except for one thing. It has four places, but there aren't any pictures in them.

Now, _____ and I are going to show you how to use the picture book and answer sheets to play the picture game. Watch us carefully so you will know how to play the game when it's your turn. Good.

Demonstration of #1: _____, I will say a word, then I want you to put your finger on the picture of the word I have said. But, before you pick the picture, be sure to look carefully at <u>all</u> four pictures in the picture book.

Are you ready to try it? Point to <u>car</u>. Keep pointing to <u>car</u>. Now find the place on your answer sheet where <u>car</u> would be and mark it. It should be the place that is the same as the picture of <u>car</u> in the picture book. Very good.

Now I want everyone to try this same one. Point to car. Keep pointing to car, and find the place on the answer sheet that is the same as the one you are pointing to in your picture book. Did you do it the same as _____ did? Good. Move your cover sheet down now so you can see number 2.

Okay, let's try another one. Turn to page 2 and make sure you are looking only at page 2. Now point to cow. Be sure you remember to look at all four pictures first. Now keep pointing to cow while you find the place on your answer sheet where cow would be. Mark an X in that place just like you did before. Good. Move your cover sheet down so you can see box number 3.

Now turn to page 3, and make sure you are only looking at page 3. Point to baby after you have looked at all four pictures. Keep pointing to baby. Now find the place on your answer sheet that is the same as the one you are pointing to, and mark it. Now move your yellow sheet so you can see box #4.

Now turn to page 4. Point to girl. Be sure you look at all four pictures before you pick one. Keep pointing to girl. Now find the place on your answer sheet where girl would be and mark it. Good. This was the last box on this page, so turn the page and find box #5. Cover all the others so you can only see box #5.

Okay, turn to page 5 in your picture book. Point to ball and mark it. Good. Now lets try #6. Move your cover sheet so you can see box #6, and turn your picture book to page 6.

Point to block after you have looked at all four pictures. Mark the place where it is on your answer sheet. Good.

Now lets do number 7. (Check to be sure kids have moved cover sheet down, and have turned to page 7). Point to clown and mark it on your answer sheet.

Okay, here's number 8. Are you ready? Point to key and mark it in your answer booklets.

Now, turn to the next page in your answer book. The first box on this page is number 32. So, let's turn to page 32 in our picture books. Okay, are you ready?

Point to caboose and mark it on your answer sheet. Good. Now move your cover sheet so you can see box #33 and turn to page 33 in your picture book.

[Continue in this manner, occasionally reminding children to look at all four pictures, and to keep pointing to the picture while they mark their answer sheets.]

Test Items for Group Administration (Form A, items 32-75)

32. Caboose
33. Envelope
34. Picking
35. Budge
36. Goggles
37. Peacock
38. Queen
39. Coach
40. Whip
41. Net
42. Freckle
43. Eagle
44. Twist
45. Shining
46. Dial
47. Yawning
48. Tumble
49. Signal
50. Capsule
51. Submarine
52. Thermos
53. Projector
54. Group
55. Tackling
56. Transportation
57. Counter
58. Ceremony
59. Pod
60. Bronco
61. Directing
62. Funnel
63. Delight
64. Lecturer
65. Communication
66. Archer
67. Stadium
68. Excavate
69. Assaulting
70. Stunt
71. Meringue
72. Appliance
73. Chemist
74. Arctic
75. Destruction

Minnesota Picture Vocabulary Test (MPVT)

Instructions and Items Used in Group Administration

Instruction for Group Administration:

Hi! My name is _____. Today we are going to play a picture game with you.

On your desks, you have a booklet of pictures, an answer sheet booklet, and a yellow cover sheet. [Show each as it is mentioned.] Now, take your pencil and write your name on the cover of the answer sheets. Good!

Okay, let's turn to the first page of your answer sheets. All the pages in this booklet are the same. There are four boxes on each page, but we only want to look at one box at a time. Now, take your yellow cover sheet, and cover all of the boxes on the page except box number 1. Like this [demonstrate]. Good!

Now, take your booklet of pictures and put it next to your answer sheet booklet. These picture books that you are using are not ours, and they are very expensive, so please be careful with them. Do not make any marks in them. Okay, you can open your picture book now. Turn to page 5. It looks like this [show booklet]. Be sure you are only looking at page 5. You can see that there are four places on this page, and each one has a picture in it. Now, box #5 on your answer sheet looks just like page #5 in your picture book except for one thing. It has four places, but there aren't any pictures in them.

Now, _____ and I are going to show you how to use the picture book and answer sheets to play the picture game. Watch us carefully so you will know how to play the game when it's your turn. Good.

Demonstration of #5: _____, I will say a word, then I want you to put your finger on the picture of the word I have said. But, before you pick the picture, be sure to look carefully at <u>all</u> four pictures in the picture book.

Are you ready to try it? Point to <u>ball</u>. Keep pointing to <u>ball</u>. Now find the place on your answer sheet where <u>ball</u> would be and mark it. It should be the place that is the same as the picture of <u>ball</u> in the picture book. Very good.

Now I want everyone to try this same one. Point to ball. Keep pointing to ball, and find the place on your answer sheet that is the same as the one you are pointing to in your picture book. Did you do it the same as _____ did? Good. Move your cover sheet down now so you can see box number 6.

Okay, let's try another one. Turn to page 6 and make sure you are looking only at page 6. Now point to gun. Be sure you remember to look at all four pictures first. Now keep pointing to gun while you find the place on your answer sheet where gun would be. Mark an X in that place just like you did before. Good. Move your cover sheet down so you can see box number 7..

Now turn to page 7, and make sure you are only looking at page 7. Point to flag after you have looked at all four pictures. Keep pointing to flag. Now find the place on your picture sheet that is the same as the one you are pointing to, and mark it. Now move your yellow sheet so you can see box #8.

Now turn to page 8. Point to toys. Be sure you look at all four pictures before you pick one. Keep pointing to toys. Now find the place on your answer sheet where toys would be and mark it. Good. This was the last box on this page, so turn the page and find box #9. Cover all the others so you only see box #9.

Turn to page 9 in your picture book. Point to teller and mark it on your answer sheet. Good. Now move your cover sheet so you can see box #10 and turn to page 10 in your picture book.

[Continue in this manner, occasionally reminding children to look at all four pictures, and to keep pointing to the picture while they mark their answer sheets.]

Test Items for Group Administration:

9. Teller	18. Check	27. Penny	36. Crew
10. Period	19. Paragraph	28. Table of Contents	37. Yardstick
11. Money	20. Taxi	29. Fire Station	38. Sea plane
12. Quarter	21. Telephone booth	30. Quotation marks	39. Traffic light
13. Tape measure	22. Inch	31. Terminal	40. Billboard
14. Pedestrian	23. Quart	32. Change	41. Skyline
15. Departure	24. Hangar	33. Encyclopedia	42. Theater
16. Helicopter	25. Equal	34. Crosswalk	43. Foot
17. Cockpit	26. Pint	35. Safe	44. Dictionary

Weekly Tests

Instructions and Sample Test Pages for Weekly Picture Recognition Test and Weekly Grouping Test

Instructions for Group Administration of Weekly Picture Recognition Test:

Hi! My name is _____. Today we are going to play a picture game with you.

On your desks, you have a booklet of pictures, an answer sheet booklet, and a yellow cover sheet. [Show each as mentioned.] Now, take your pencil and write your name on the cover of the answer sheets. Good!

Okay, let's turn to the first page of your answer sheets. All the pages in this booklet are the same. There are four boxes on each page, but we only want to look at one box at a time. Now, take your yellow cover sheet, and cover all the boxes on the page except box number 1. Like this [demonstrate]. Good!

Now take your booklet of pictures and put it next to your answer sheet booklet. Do not make any marks in the picture books. Okay, you can open your picture book now. Turn to page 1. It looks like this [show booklet]. Be sure you are only looking at page 1. You can see that there are four places on this page, and each one has a picture in it. Now, box #1 of your answer sheet looks just like page #1 in your picture book except for one thing. It has four places, but there aren't any pictures in them.

I will say a word, then I want you to put your finger on the picture of the word I have said. But, before you pick the picture, be sure to look carefully at all four pictures in the picture book. Are you ready to try it? Point to (billboard). Keep pointing to (billboard). Now find the place on your answer sheet where (billboard) would be and mark it. It should be the place that is the same as the picture of (billboard) in the picture book. Very good. Now move your cover sheet down so you can see box #2, and turn to page 2 in your picture books.

Okay, let's try another one. Turn to page 2 and make sure you are looking only at page 2. Now point to (apartment building). Be sure you remember to look at all four pictures first. Now keep pointing to (apartment building) while you find the place on your answer sheet where (apartment building) would be. Mark an X in that place just like you did before. Good. Move your cover sheet down so you can see box number 3.

[Continue in the same manner with items 3 through 15. Occasionally remind the children to look at all four pictures, and to keep pointing to the picture while they mark their answer sheets.]

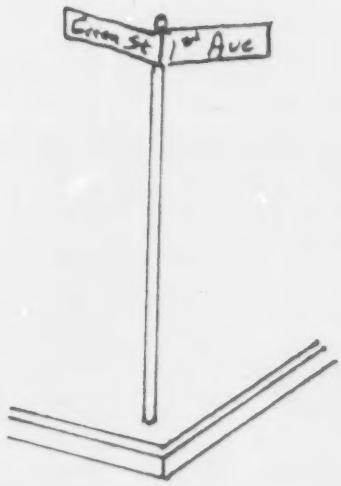
Example of Instructions for Group Administration of Weekly Grouping Test:

On [day of week] we had picture books and special pictures about (walking in the city). One (thing in the city) that we learned about was a (pedestrian). Can you see the (pedestrian) at the top of the page? Good. Put a big X on the (pedestrian). Now you think about the special picture(s) you had, and try to remember the other (things) in the city that we learned about with (pedestrian).

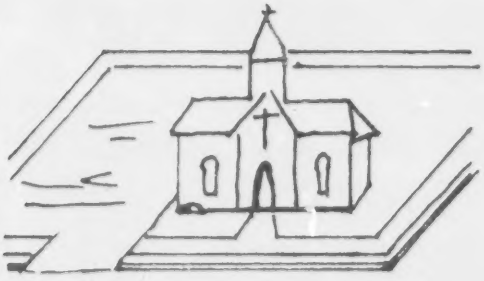
Now, look at each picture on this page. If you think that it is one of the (things in the city) that we learned with (pedestrian), then put an X on it. Look at all of the pictures, and make sure that you only put an X on the ones that we learned with (pedestrian).

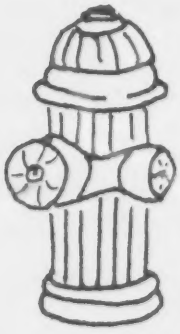
This same procedure was used for each grouping picture, with specific wordings outlined for each picture. Wording varied with the subject matter.

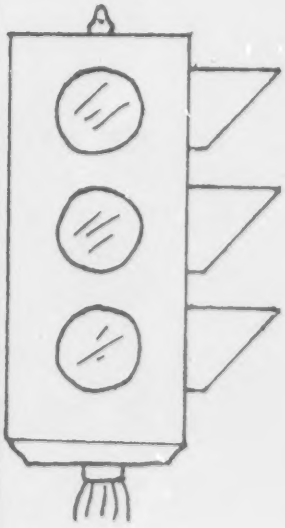
Sample Test Page for Weekly Grouping Test: (see page 65).

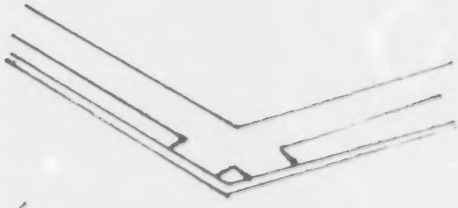

Grove St
1st Ave

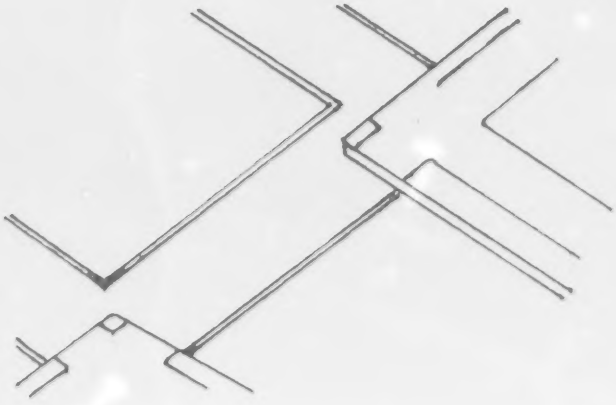
BUS
STOP











Utilization of Vocabulary and Instructional Strategies

Individual Test (UVISIT)

Instructions

Warm-up: Establish rapport with the child, and encourage him to do most of the talking.

1. General topics: weather, school, current events, sports.

2. Final Warm-up: Ask, "Has your class gone on any field trips this year? Where did you go?" Then select a field trip that is unrelated to the UVISIT city picture, and have the child elaborate on it.

Part 1:

1. Say: "Now I'm going to show you a picture, and I want you to look at this picture very carefully."
   -Show the UVISIT picture, and allow about 15 seconds for the child to look it over.

2. Say: "Now, I want you to tell me all about this picture. I'm going to listen to you and write some things down, but I'm not going to interrupt you and talk to you about the picture. You keep talking, and tell me all about the picture."

   a. Don't interact with the child except to say again, "Tell me all about the picture," or "Can you tell me more about the picture?"

   b. Don't answer questions.

   c. Don't give feedback on child's approach.

   d. Don't provide reinforcement because this may serve to unfairly reinforce his style (e.g., listing or relating).

   e. After any long pause, ask: "Is there any more you want to tell me about this picture?"

3. Conclude by sincerely saying "You told me a lot about this picture."

Part 2:

1. Say: "Now, suppose we divide this whole picture into two parts. Just like we would take scissors and cut the picture into two seperate pictures. The top part of the picture shows the downtown part of the city and the freeway, and the bottom part shows 3 blocks in the city."

2. Say: "Now let's look at just these 3 blocks, and not the rest of the city, and we'll play a pretend game. Let's pretend that I don't know anything about this part of the city, and I want you to tell me a story about it. So, would you tell me a story and say what everything is, where it is, and which things go together?"

   Prompts:

   a. "Tell me a story about the things."

   b. "Tell me whole sentences - don't just name things."

   c. "Don't just point to things - tell me where they are."

31. R. Riegel, A. Taylor, S. Clarren, & F. Danner. Training educationally handicapped children to use associative grouping strategies for the organization and recall of categorizable materials. Research Report #42. November 1972.

32. R. Riegel, F. Danner, & A. Taylor. Steps in sequence: Training educationally handicapped children to use strategies for learning. Development Report #2. November 1972.

33. A. Taylor, M. Thurlow, & J. Turnure. The teacher's introduction to: The math vocabulary program. Development Report #1. March 1973.

34. J. Turnure & M. Thurlow. The effects of structural variations in elaboration on learning by normal and EMR children. Research Report #41. September 1972.

35. A. Taylor & N. Bender. Variations of strategy training and the recognition memory of EMR children. Research Report #40. September 1972. (American Educational Research Journal, in press).

36. D. Moores, C. McIntyre, & K. Weiss. Evaluation of programs for hearing impaired children: Report of 1971-72. Research Report #39. September 1972.

37. R. Rubin. Follow-up of applicants for admission to graduate programs in special education. Occasional Paper #11. July 1972.

38. D. Moores. Communication - Some unanswered questions and some unquestioned answers. Occasional Paper #10. July 1972.

39. A. Taylor & S. Whitely. Overt verbalization and the continued production of effective elaborations by EMR children. Research Report #38. June 1972. (American Journal of Mental Deficiency, in press).

40. R. Riegel. Measuring educationally handicapped children's organizational strategies by sampling overt groupings. Research Report #37. May 1972.

41. E. Gallistel, M. Boyle, L. Curran, & M. Hawthorne. The relation of visual and auditory aptitudes to first grade low readers' achievement under sight-word and systematic phonic instruction. Research Report #36. May 1972.

42. E. Gallistel & P. Fischer. Decoding skills acquired by low readers taught in regular classrooms using clinical techniques. Research Report #35. May 1972.

43. J. Turnure & M. Thurlow. Verbal elaboration in children: Variations in procedures and design. Research Report #34. March 1972.

44. D. Krus & W. Bart. An ordering-theoretic method of multidimensional scaling of items. Research Report #33. March 1972.

45. J. Turnure & S. Larsen. Effects of various instruction and reinforcement conditions on the learning of a three-position oddity problem by nursery school children. Research Report #32. March 1972.

46. J. Turnure & S. Larsen. Outerdirectedness in mentally retarded children as a function of sex of experimenter and sex of subject. Research Report #31. March 1972.

47. J. Rynders & J. Horrobin. A mobile unit for delivering educational services to Down's Syndrome (Mongoloid) infants. Research Report #30. January 1972. (Presented at Council for Exceptional Children, Special National Conference, Memphis, December, 1971).

48. F. Danner & A. Taylor. Pictures and relational imagery training in children's learning. Research Report #29. December 1971. (Journal of Experimental Child Psychology, in press).

49. J. Turnure & M. Thurlow. Verbal elaboration phenomena in nursery school children. Research Report #28. December 1971. (Study II: Proceedings of 81st Annual Convention of the American Psychological Association, in press).

50. D. Moores & C. McIntyre. Evaluation of programs for hearing impaired children: Progress report 1970-71. Research Report #27. December 1971.

51. S. Samuels. Success and failure in learning to read: A critique of the research. Occasional Paper #9. November 1971. (In M. Kling, the Literature of Research in Reading with Emphasis on Modes, Rutgers University, 1971).

52. S. Samuels. Attention and visual memory in reading acquisition. Research Report #26. November 1971.

53. J. Turnure & M. Thurlow. Verbal elaboration and the promotion of transfer of training in educable mentally retarded children. Research Report #25. November 1971. (Journal of Experimental Child Psychology, 1973, 15, 137-148.

54. A. Taylor, M. Josberger, & S. Whitely. Elaboration training and verbalization as factors facilitating retarded children's recall. Research Report #24. October 1971. (Journal of Educational Psychology, in press).

55. W. Bart & D. Krus. An ordering-theoretic method to determine hierarchies among items. Research Report #23. September 1971.

56. A. Taylor, M. Josberger, & J. Knowlton. Mental elaboration and learning in retarded children. Research Report #22. September 1971. (Mental Elaboration and Learning in EMR children. American Journal of Mental Deficiency, 1972, 77, 69-76).

57. J. Turnure & S. Larsen. Outerdirectedness in educable mentally retarded boys and girls. Research Report #21. September 1971. (American Journal of Mental Deficiency, in press).

58. R. Bruininks, T. Glaman, & C. Clark. Prevalency of learning disabilities: Findings, issues, and recommendations. Research Report #20. June 1971. (Presented at Council for Exceptional Children Convention, Miami Beach, April, 1971).

59. M. Thurlow & J. Turnure. Mental elaboration and the extension of mediational research: List length of verbal phenomena in the mentally retarded. Research Report #19. June 1971. (Journal of Experimental Child Psychology, 1972, 14, 184-195.

60. G. Siegel. Three approaches to speech retardation. Occasional Paper #8. May 1971.

61. D. Moores. An investigation of the psycholinguistic functioning of deaf adolescents. Research Report #18. May 1971. (Exceptional Children, May 1970, 36, 645-652).

62. D. Moores. Recent research on manual communication. Occasional Paper #7. April 1971. (Keynote Address, Division of Communication Disorders, Council for Exceptional Children Annual Convention, Miami Beach, April 1971).

63. J. Turnure, S. Larsen, & M. Thurlow. Two studies on verbal elaboration in special populations. I. The effects of brain injury. II. Evidence of transfer of training. Research Report #17. April 1971. (Study I: American Journal of Mental Deficiency, in press).

64. R. Bruininks & J. Rynders. Alternatives to special class placement for educable mentally retarded children. Occasional Paper #6. March 1971. (Focus on Exceptional Children, 1971, 3, 1-12).

65. D. Moores. Neo-oralism and the education of the deaf in the Soviet Union. Occasional Paper #5. February 1971. (Exceptional Children, January 1972, 39, 377-384).

66. D. Feldman, S. Markman, & S. Hartfeldt. Unusualness, appropriateness, transformation and condensation as criteria for creativity. Research Report #16. February 1971. (American Educational Research Association Annual Conference, New York, February 1971).

67. P. Brown & G. Siegel. Variations in normal speech disfluencies. Research Report #15. January 1971. (Language & Speech, in press).

68. D. Feldman. The contradistabding as a possible crystallizer of cognitive structures. Occasional Paper #4. January 1971. (American Educational Research Journal, 1971, 3, 484-502).

69. J. Rynders. Industrial arts for elementary mentally retarded children: An attempt to redefine and clarify goals. Occasional Paper #3. January 1971.

70. D. Moores. Education of the deaf in the United States. Occasional Paper #2. November 1970. (Moscow Institute of Defectology, 1971, published in Russian).

71. R. Bruininks & C. Clark. Auditory and learning in first-, third-, and fifth-grade children. Research Report #14. November 1970.

72. R. Bruininks & C. Clark. Auditory and visual learning in first grade educable mentally retarded normal children. Research Report #11. November 1970. (American Journal of Mental Deficiency, 1972, 76, No. 5, 561-567).

73. R. Bruininks. Teaching word recognition to disadvantaged boys with variations in auditory and visual perceptual abilities. Research Report #12. November 1970. (Journal of Learning Disabilities, 1970, 3, 38-39).

74. R. Bruininks & W. Lucker. Change and stability in correlations between intelligence and reading test scores among disadvantaged children. Research Report #11. October 1970. (Journal of Reading Behavior, 1970, 2, 295-305).

75. R. Rubin. Sex differences in effects of kindergarten attendance on development of school readiness and language skills. Research Report #10. October 1970. (Elementary School Journal, 72, No. 5, February 1972).

76. R. Rubin & B. Balow. Prevalence of school learning & behavior disorders in a longitudinal study population. Research Report #9. October 1970. (Exceptional Children, 1971, 38, 293-299).

77. D. Feldman & J. Bratton. On the relativity of giftedness: An empirical study. Research Report #8. August 1970. (American Educational Research Annual Conference, New York, February 1971).

78. J. Turnure, M. Thurlow, & S. Larsen. Syntactic elaboration in the learning & reversal of paired-associates by young children. Research Report #7. January 1971.

79. R. Martin & L. Berndt. The effects of time-out on stuttering in a 12-year-old boy. Research Report #6. July 1970. (Exceptional Children, 1970, 37, 303-304).

80. J. Turnure & M. Walsh. The effects of varied levels of verbal mediation on the learning and reversal of paired associates by educable mentally retarded children. Research Report #5. June 1970. (Study I: American Journal of Mental Deficiency, 1971, 76, 60-67. Study II: American Journal of Mental Deficiency, 1971, 76, 306-312).

81. J. Turnure, J. Rynders, & N. Jones. Effectiveness of manual guidance, modeling & trial & error learning for inducing instrumental behavior in institutionalized retardates. Research Report #4. June 1970. (Merrill-Palmer Quarterly, 1973, 19, 49-65).

82. J. Turnure. Reactions to physical and social distractors by moderately retarded institutionalized children. Research Report #3. June 1970. (Journal of Special Education, 1970, 4, 283-294).

83. D. Moores. Evaluation of preschool programs: An interaction analysis model. Occasional Paper #1. April 1970. (Keynote Address, Diagnostic Pedagogy, International Congress on Deafness. Stockholm, August 1970, also presented at American Instructors of the Deaf Annual Convention, St. Augustine, Florida, April, 1970).

84. D. Feldman & W. Markwalder. Systematic scoring of ranked distractors for the assessment of Piagetian reasoning levels. Research Report #2. March 1970. (Educational and Psychological Measurement, 1971, 31, 347-362).

85. D. Feldman. The fixed-sequence hypothesis: Individual differences in the development of school related spatial reasoning. Research Report #1. March 1970.